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Edited by

H. A. Hare, M.D.

Professor of Therapeutics and Diagnosis in the Jefferson Medical College,

GENERAL THERAPEUTICS,

and

Edward Martin, M.D.

Professor of Surgery in the University of Pennsylvania,

SURGICAL AND GENITO-URINARY THERAPEUTICS.

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ORIGINAL COMMUNICATIONS.

THE DIFFERENTIATION AND TREATMENT OF SYPHILITIC AND TUBERCULOUS SKIN LESIONS.[1]

BY WILLIAM S. GOTTHEIL, M.D.,

Professor of Dermatology and Syphilography, Fordham University School of Medicine, etc.

"Syphilis or Not Syphilis" is the suggestive title of a valuable little book written by a London dermatologist some years ago; and the idea that it conveys is of prime importance. At times this is one of the most difficult as well as important of the differentiations that we must make: Are we dealing with one of the protean manifestations of treponema activity, or with phenomena occasioned by the tubercle bacillus, or with symptoms caused by some other, possibly unknown, morbific agent. Our prognosis and our treatment both depend on the decision; and instances will readily occur to all of us in which failure in this elementary diagnosis has been fraught with disastrous consequences. The old and now abandoned terminology, "syphilitic acne," "syphilitic impetigo," "syphilitic varicella," "syphilitic pemphigus," etc., was a visible sign, in the earlier and less well developed stages of dermatological diagnosis, of the difficulties that confronted the physician. For syphilography and dermatology are indissolubly connected. The syphilographer must be first and foremost a dermatologist, since three-fourths of the phenomena of the luetic disease in its earlier and acuter and most important stages occur upon the skin and the visible mucosæ. The old and illegitimate connection between syphilis and genito-urinary diseases, based on the merely accidental fact that most of the inoculations of syphilis occur upon the skin covering the external end of the genito-urinary tract, is rightly falling into desuetude.

The first fact that confronts us in our consideration is that frank tuberculosis of the skin is comparatively rare in this country, whilst syphilodermata are very common. Lupus vulgaris, the best known type of tuberculosis of the skin, is much rarer here than in Europe, and is apparently getting less frequent year by year. Other forms of recognized skin tuberculosis are so uncommon that they are shown as rarities in dermatological societies. Further, there is a distinct group of dermatoses for which a tubercular origin is predicated by some authorities and denied by others; the evidence is still inconclusive, and the matter is still in doubt. The microscope helps us but little in these cases, and the various blood examinations and skin reactions, for reasons that will be gone into later, are weak staffs to lean on. The difficulties of diagnosis in certain cases may be so great as to be almost insuperable, as witness a case now in my service in the City Hospital of New York, in which an extensive ulceration of the genitals and buttocks, long under observation, is labeled with a diagnosis that swings from syphilis to tuberculosis and back again as temporary changes under the influence of time or treatment turn it one way or the other. (Fig. IX.)

I propose to consider first and briefly the features of those dermatoses that are admittedly tubercular and toxitubercular, as well as those that are supposedly of similar

[1] Read before the Associated Physicians of the New York Board of Health Tuberculosis Clinics, Feb. 9, 1916.

nature, and the syphilitic affections which they resemble and may be confounded with; and finally to discuss the means in our possession for the differential diagnosis of the two sets of conditions I have referred to.

There are not less than five generally acknowledged clinical forms of tubercular infection of the skin, two of which are common enough and distinctive enough to be readily recognized; the others are much rarer and more difficult to diagnose. Briefly described, they are the following:

1. *Lupus vulgaris,* appearing as reddish or brownish spreading patches of varying size; the patches consisting of deep-seated, soft, "apple-jelly" papules, nodules, and larger infiltrations, or hypertrophic tissue, and terminating in destruction of the affected area of skin with or without ulceration. (Fig. I.)

2. *Tuberculosis cutis verrucosa* (including verruca necrogenica, post-mortem or anatomic tubercle): Isolated papules or circumscribed aggregations of papules of varying size and shape, brownish or violaceous in color, warty or vegetating, and occurring especially on the extremities. (Fig. III.)

3. *Miliary tuberculosis of the skin:* A general eruption of small, brownish-red, conical papules, often breaking down to form sharp-cut ulcerations, and usually a part of a general miliary tuberculosis. (Fig. V.)

4. *Scrofuloderma:* A localized ulcerative tuberculosis of the skin and subcutis, secondary to tuberculosis of the lymphatic glands. (Fig. VII.)

5. *Tuberculosis cutis orificialis:* Tubercular ulcerations occurring on the skin near the natural orifices of the body, appearing as indolent, discrete, painless, progressive, rounded, shallow ulcerations, with miliary tubercles in their neighborhood, and almost always coincident with visceral tuberculosis. (Fig. IX.)

In addition to this there are several dermatoses apparently related to tuberculosis which have been designated "tuberculides" or "toxituberculides."

1. *Acnitis* (acne cachecticorum, acne varioliformis, acne necrotica): An indolent, persistent eruption of pin-point to pea-sized, firm, brownish-red papules and nodules, usually on the face, retrogressing by absorption, and leaving small pigmented, depressed scars behind. (Fig. XI.)

2. *Folliclis:* An eruption of indolent reddish papules, sometimes becoming vesicles, seated on the limbs, involuting slowly with the formation of depressed, adherent, horny centers, occurring in crops, and leaving depressed scars.

3. *Erythema induratum:* Chronic, circumscribed, purplish-red, nodular infiltrations of the skin, affecting especially the lower limbs, disappearing by absorption or ulceration, and leaving permanent pigmented scars.

Finally, and in a class by itself, is a very common affection the tubercular nature of which is assumed by some authorities and denied by others, without, at present, any positive evidence either way. I refer to

Lupus erythematosus: Well-defined reddish or reddish-brown patches covered with yellowish or grayish adherent scales, seated usually on the center of the face, progressing slowly, and ending in scar formation.

The chief differential diagnoses between these affections and the syphilitic lesions that resemble them are between lupus vulgaris and the tubercular syphiloderm, general miliary tuberculosis and the general papular syphiloderm, scrofuloderma and tertiary gummatous ulceration, tuberculosis cutis orificialis, and a like tertiary syphilitic ulceration. The other tubercular and toxitubercular affections of the skin are either so characteristic as to require no special elaboration of their differential diagnosis, or they resemble non-specific affections such as ordinary acne, and so do not fall within the purview of the present paper. Before going into the subject of the differential diagnosis of the affections mentioned, I desire to say a few words concerning some of the tests used and advised in both conditions.

In the first place it must be insisted on that the differential diagnosis between these non-specific and specific conditions must rest first and last upon their physical fea-

tures; it is unfortunate that some of these diseases are rare, and few of us have the opportunity to see many cases and acquire facility in their recognition. Nevertheless, a lupus nodule and a syphilitic papule are two absolutely characteristic and entirely different things, and so are a tubercular ulceration and a broken-down gumma; and the undoubted presence of one or the other settles the diagnosis, no matter what the laboratory test may show. For it must never be forgotten that a patient may have a Wassermann positive blood and still have a tuberculous affection of the skin; and conversely, he may have a definite syphilitic lesion, and yet be a tuberculous subject. There remain, however, certain cases of legitimate doubt, and these are the ones, and the only ones, in which laboratory tests are decisive. The tendency at the present time to rely on the laboratory for a differential diagnosis leads to much error, and is greatly to be deprecated.

(A) The Wassermann and Noguchi tests for syphilis. The trend among general practitioners at the present time is to regard these tests as decisive; given a positive result the affection in question is syphilitic. Leaving out of consideration certain minor points such as the few and rare conditions other than syphilis that give a positive Wassermann, a laboratory result of this kind only shows that the patient, at some time or other in his life, has had syphilis; it is no evidence in itself that the skin lesion under consideration is specific; it is absolutely valueless in diagnosis if the lesion shows distinct evidence of non-specific origin; and it is at best merely confirmative evidence if other signs of lues are present, and presumptive evidence if they are absent and the case is one of doubt. The now generally accepted fact that a patient who has once in his life had syphilis may permanently or temporarily have a positive Wassermann blood at any time shows the utter uselessness of basing a diagnosis on this factor alone.

(B) The tuberculosis tests—Von Pirquet, Calmette, Moro, etc. Before this audience of specialists in tuberculosis I approach this phase of my subject with some trepidation; but I think you will concede that the status of these tests is very much the same as that of the Wassermann. A positive result shows the presence of a tuberculous focus somewhere in the body; it does not, of itself, show that the skin lesion under consideration is of tuberculous nature. Like the specific blood test, it is confirmative evidence if the other factors point the same way, and presumptive evidence if these latter are entirely doubtful.

(C) The microscope. Here also we must exercise a wise conservatism and not accept laboratory conclusions without reserve. It is rarely possible to demonstrate the tubercle bacillus in tuberculous skin lesions; and the inoculation test, though more reliable, cannot be regarded as conclusive. Characteristic and early tuberculous lesions can indeed be differentiated from early syphilitic ones; but in the differentiation of the later chronic forms of both varieties of disease it leaves us entirely in doubt. It is impossible in most cases, for instance, to differentiate with the microscope between a tertiary syphilitic lesion and a chronic tuberculosis of the skin.

The readiest and also the most reliable means of differentiating tuberculosis of the skin from syphilis of the skin is by sight and touch; the history of the disease and the signs of one or other of these infections which we can elicit in the test-tube or under the microscope are secondary aids. Putting the commoner cases in tabular form before you we have the following points of differential diagnosis:

FIGS. I AND II.

Lupus Vulgaris.	*Tubercular Syphiloderm.*
1. Begins usually in childhood.	Begins usually after puberty.
2. Course very slow; takes years.	Course fast; takes days or weeks.
3. Nodules soft, yellow, apple-jelly like, deep-seated, not protuberant.	Nodules firm, brownish-red, and protuberant.
4. Ulcers superficial, irregular, with markedly undermined edges and slight discharge.	Ulcers deep, with sharp edges and much discharge.
5. Crusts scanty and reddish-brown.	Crusts large, greenish-black, and lamellated (rupial).
6. Concomitant signs of tuberculous disease; positive tests for tuberculosis.	Concomitant signs of syphilis past or present; positive blood test.
7. Scars hard, yellow, and shrunken.	Scars superficial, white, soft, and smooth.
8. Possible history of tuberculosis in patient and family.	Possible history of syphilis.

FIG. I.—Lupus vulgaris.

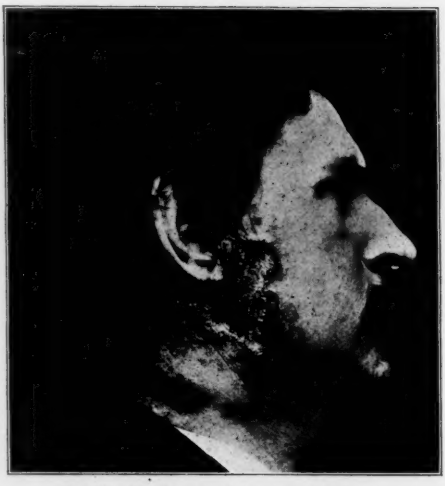

FIG. II.—Tertiary serpiginous syphiloderm.

FIG. III.—Tuberculosis cutis verrucosa.

FIG. IV.- Tertiary tubercular syphilitic ulceration.

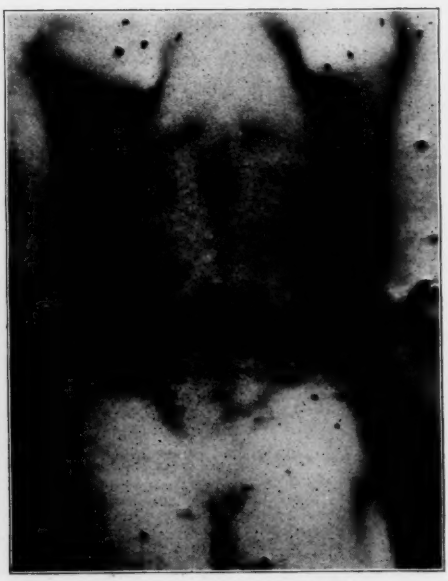

FIG. V.—Tuberculosis cutis, miliary form.

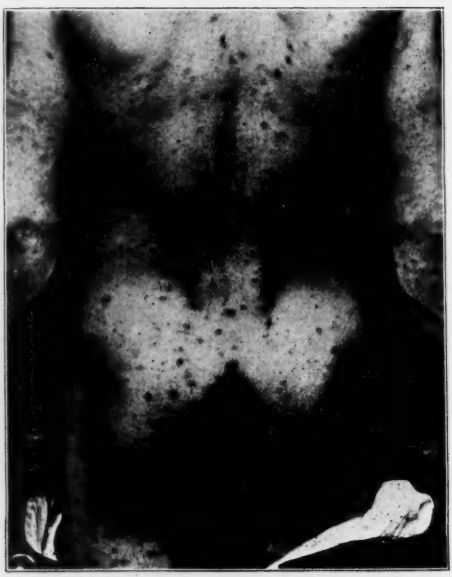

FIG. VI.—Secondary papular syphiloderm.

FIG. VII.—Scrofuloderma.

FIG. VIII.—Exulcerated gumma.

FIG. IX.—Tuberculosis cutis orificialis.

FIG. X.—Tertiary ulcerative syphiloderm.

FIG. XI.—Acne necrotica.

FIG. XII.—Secondary pustular syphiloderm.

FIGS. III AND IV.

Tuberculosis Cutis Verrucosa.	*Tubercular Syphiloderm.*
1. Lesion single, growth extremely slow.	Lesions often multiple, growth rapid.
2. Almost always on hands and forearms only.	Seated anywhere.
3. Dry and verrucous always.	Ulcerates frequently.
4. Color violaceous.	Color reddish-brown.
5. Never crusted.	Frequent crusting, perhaps rupial.
6. Possible concomitant signs of tuberculosis, tests and others.	Possible concomitant signs of syphilis.
7. Possible history of tuberculosis.	Possible history of syphilis.
8. Does not react to antiluetic treatment.	Reacts to antiluetic treatment.
9. Occurs chiefly in male adults who have been exposed to dead or living animal tissues.	Occurs in any one.

FIGS. V AND VI.

Miliary Tuberculosis.	*General Papulotubercular Syphiloderm.*
1. Extremely rare.	Very common.
2. Extremely chronic; takes years.	Course rapid; takes days.
3. Occurs mostly in children.	Occurs mostly in adults.
4. Ulceration and crusting common.	Ulceration and crusting rare.
5. Concomitant signs and test for tuberculosis.	Concomitant signs and tests for syphilis.
6. Usually follows a severe eruptive fever.	No such connection.
7. Does not react to antiluetic treatment.	Reacts to antiluetic treatment.

FIGS. VII AND VIII.

Scrofuloderma.	*Exulcerated Gumma.*
1. Occurs chiefly in children.	Occurs chiefly in adults.
2. Course extremely chronic; takes months and years.	Course much more rapid; takes days and weeks.
3. Occurs in connection with a chronic adenitis, most often around the neck.	Has no such connection.
4. Ulcer oval or rounded, edges thin, undermined, violaceous; base uneven and covered with flabby granulations.	Ulcer irregular, edges thick, reddish-brown, base irregular and hypertrophic, discharge abundant and gummatous.
5. Scars irregular, knotty and hard; tend to become keloidal.	Scars smooth, soft, and white.
6. Concomitant signs and symptoms of and history of tuberculosis.	Concomitant symptoms, signs, and history of syphilis.
7. Does not respond to antiluetic treatment.	Responds to antiluetic treatment.

FIGS. IX AND X.

Tuberculosis Cutis Orificialis.	*Tertiary Gummatous Ulceration.*
1. Extremely rare.	Very common.
2. Course extremely chronic; no tendency to healing.	Course more rapid; tendency to final spontaneous healing.
3. Seat always near a mucous orifice.	Seat anywhere.
4. Miliary nodules probable in base and neighborhood of ulcer.	No miliary nodules.
5. Concomitant signs, symptoms, and history of tuberculosis always present.	Concomitant signs of syphilis possibly present.

FIGS. XI AND XII.

Acnitis and Folliclis.	*Papular and Pustular General Syphiloderm.*
1. Seat on face and arms.	Seat on the general body surface.
2. Course extremely chronic, lasting years.	Course comparatively acute; lasts days and weeks.
3. Active and past lesions, in all stages, present at one time.	Lesions in practically one stage at the same time.
4. Lesions usually few.	Lesions usually many.
5. Concomitant symptoms, signs, and history of tuberculosis probably not present.	Concomitant symptoms, signs, and history of syphilis probably present.
6. Does not react to antiluetic treatment.	Reacts to antiluetic treatment.

This ends the list, so far as the differential diagnosis of tubercular and syphilitic affections of the skin is concerned. I have not touched at all, as foreign to the title of this paper, on the many non-luetic skin affections that may be, and I am sorry to say daily are, confounded with tuberculosis of the skin; nor have I by any means exhausted my more immediate subject. I found, as is so often the case, that the subject grew upon me as I wrote; and I might readily, if I have not already done so, exhaust my limits and your patience. I shall conclude with a brief consideration of the therapeusis of these affections.

THERAPEUSIS.

It is not necessary here to enter upon any discussion of the treatment of either constitutional syphilis or tuberculosis in general; their main lines are well known. A few words, however, about the local treatment, and especially about certain newer methods, may be useful.

Local Treatment of the Syphilodermata.—There is a marked tendency to neglect this part of the therapeusis and rely on internal medication alone. The most brilliant and quickest results are attained by a judicious combination of both external and internal medication. For isolated and non-secreting syphilitic lesions there is no better local treatment than the application of a well-fitted piece of mercurial plaster, or of one of the mercurial collemplastra, covered with ZO plaster to protect the clothing. Ulcerated, moist, or secreting lesions should be softened and have all crusts removed by soaking with a 2-per-cent salicylic acid-olive oil mixture, and then dressing with a 5- to 10-per-cent solution of oleate of mercury in oil. The official white precipitate ointment, strengthened perhaps with 1 to 5 per cent of unguentum hydrargyri, is useful in many cases. Bichloride wet compresses are usually too troublesome, and are liable to cause local inflammatory reactions that are undesirable.

Local Treatment of the Tuberculodermata.—Iodoform was much used at one time in the treatment of these affections;

but for various reasons it is an undesirable drug to employ, especially on the exposed parts of the body. Some one of the various forms of heliotherapy, and more especially the mercury vapor lamp, is the method to be advised to-day. A word of caution must be uttered, however, with regard to many of the so-called blue-light or therapeutic lamps that are on the market to-day. The ordinary bulb lamp, no matter what its so-called candle-power, is therapeutically useless; the amount of chemical rays that pass through the glass is so small that the claims made for the lamps are entirely unsubstantiated. A mercury vapor arc with rock crystal containers is necessary; the Finsen-Reyn, or the Kromayer lamp, or one of the modifications of them now made here, is essential for therapeutic action. Lupus vulgaris, tuberculosis cutis verrucosa, miliary tuberculosis, scrofuloderma, tuberculosis orificialis, acnitis, folliclis, may all be treated in that way.

154 West 77th Street, New York City.

THE CAUSES AND TREATMENT OF STERILITY IN WOMEN.

BY ALFRED HEINEBERG, M.D.,

Associate in Gynecology in Jefferson Medical College, Obstetrician to the Jewish Maternity Hospital, and Assistant Gynecologist St. Agnes and Mt. Sinai Hospitals, Philadelphia, Pa.

Sterility in the female is defined as inability to bring forth children, but for our purpose is understood to be inability on the part of a married couple to bring about conception; for there are many instances in which conception repeatedly occurs but the resultant pregnancies never mature, and sterility exists in spite of conception. Various types of sterility are recognized, viz.: (1) primary, (2) relative, and (3) secondary.

Primary sterility is that type in which the possibility of conception is precluded because of permanent congenital or developmental defects in the structure or function of the genital organs.

Relative sterility is a state in which the absence of conception is attributable to causes which are susceptible of correction. These causes, as we shall see, may be structural, chemical, functional, or emotional. It includes also those instances of so-called sexual incompatibility, in which a man and woman may live together in sterile marriage for many years, and each, after divorce or separation, subsequently enter into fruitful marriage with another person.

Secondary sterility, or what is commonly known as "one-child sterility," occurs in those women who fail to conceive after the birth of one child. It embraces only those in whom pregnancy is desired, but is prevented by structural changes which occur in the genital organs through puerperal infections or other complications of labor. It does not include those cases in which measures are adopted to prevent subsequent conception.

ETIOLOGY.

The causes of sterility in the female are to be sought in the husband as well as in the wife. This is a fact which cannot be too thoroughly impressed nor too well remembered. The physician who subjects a woman to an operation, no matter how slight, for the sole purpose of correcting sterility before he has carefully investigated the seminal fluid of her husband is guilty of a grave injustice to his patient. It is to be constantly borne in mind that in at least 30 per cent of the sterile marriages the fault is to be found in the husband. In the examination of 129 cases of sterility Hühner[1] fixes the responsibility of the man at 59 per cent. Reynolds[2] states as his belief that in nearly 50 per cent of sterile marriages the fault is to be found in the husband. In my own experience about 40 per cent of the husbands have been found to be sterile. I would like to emphasize that the statement of the wife as to the virility of her husband must not be accepted as *prima facie* evidence of his procreative ability. It must be remembered that copulative efficiency bears no definite relation to procreative power.

The causes of sterility in the female may be classified as follows:

1. Structural or physical.
2. Biochemical.
3. Functional.
4. Emotional or psychic.

The causes which are operative in a given case are frequently difficult to determine. In only a few cases can the sterility be attributed to a single, easily determined factor. In the majority of cases several factors are responsible, and can be discovered only after a thorough investigation. In the primary or absolute type of sterility the etiologic factors are usually easily detected, and consist of such permanent defects in structure as absent vagina or uterus, or the persistence of the infantile type of uterus. The underlying causes of secondary or one-child sterility consist usually in well-recognized changes in the structure, position, or secretions of the genital organs which result from infection or injury incident to labor. These two types of sterility, however, constitute but a comparatively small proportion of the cases. By far the largest number belong to the relative type, in which the underlying causes are frequently complicated or obscure and are discovered only after a most diligent and painstaking search. Even when studied most carefully these cases are often the source of keen disappointment and make us realize the limitation of our knowledge of the causes and treatment of sterility in the female. We shall consider each class of causes separately without attempting to demonstrate the relationship of one to another, for such an attempt would necessitate the study of innumerable combinations and would serve no definite purpose. It is far better to have a thorough knowledge of the factors which may be considered to be operative in a given case.

The *structural* causes of sterility to be found in the genital organs are best studied from without inward. They comprise those conditions which either prevent the sexual act, render it imperfect, or impede the passage of the spermatozoön toward the ovum. They may be divided into two groups—(1) congenital or developmental, and (2) acquired. To the first group belong such anatomical changes as are present at birth or result from faulty postnatal development, such as imperfect hymen, absent vagina or uterus, atresia of the vagina, infantile uterus, imperforate cervix, stenosis of the Fallopian tube, etc. It is only necessary to name most of these without further comment, for their recognition is not usually difficult. A tough unruptured hymen with a small perforation, while it may prevent coition, forms no absolute bar to conception because it does not impede the advance toward the ovum of highly motile spermatozoa which may be deposited on the surface of the vulva. This same statement applies as well to stenosis of the vagina. Flexions of the uterus, especially acute anteflexion, are frequently associated with a long, conical cervix having a narrowed canal, and a pinhole os. This combination is often cited as a cause of sterility. The factors in this combination which may be the cause of sterility are either developmental, physical, or biochemical. Uteri presenting these conditions are frequently found to be small and undeveloped. It would seem better to regard many of them as hypoplastic and associated with ovaries which are also hypoplastic, and unable to produce healthy, fertile ova. The physical hindrances to conception are claimed to be the forward direction of the cervix against the anterior vaginal wall and the stenosis of the cervical canal. Hühner maintains that conception is not likely to occur unless the semen is deposited upon the cervix near the external os, and that such deposition is difficult if the cervix has a marked anterior direction.

As to stenosis of the cervical canal it seems improbable that any narrowing of the cervical canal which is not of sufficient degree to completely obstruct the flow of menstrual fluid could, in itself, impede the progress of such a small, motile organism as the spermatozoön. The baneful influences of stenosis of the cervix are more likely to be found in biochemical changes in the cervical secretion due to faulty drainage, and these will be discussed below.

The acquired structural changes usually result from inflammatory processes or the presence of neoplasms which either occlude some part of the genital canal, or render the uterine mucous membrane unfit to retain or support the fertilized ovum. Infections of the genital organs in the female will account for a fairly large percentage of sterile marriages. Structural alterations in the uterus, tubes, ovaries, or pelvic peritoneum are to be found in most women who have been infected with the gonococcus. A chronically diseased endometrium, partly because of cellular change and partly from its toxic secretion, may either arrest the passage of the spermatozoön or present an unsuitable bed for the fertilized ovum.

The changes produced in the Fallopian tube by gonorrheal, tuberculous, or other infection which is inimical to the union of the spermatozoön and ovum, are either occlusion of one or both ends of the tube or loss of the ciliated epithelium of the tubal mucosa. Sterility due to tubal atresia is not as a rule difficult to determine, because a tube thus occluded is usually distended, tender, and prolapsed into Douglas's cul-de-sac, where it may be easily palpated. If it be true that the passage of the ovum along the tubal canal is due to the activity of the ciliated epithelium and that impregnation occurs within the tube, we can readily appreciate that the loss of the cilia might prevent conception through failure in the conveyance of the ovum to a spot favorable for its union with the spermatozoön. Loss of cilia, even if accepted as a cause of sterility, can only be surmised, for it may not be demonstrated by any known method of examination before the tube is excised and subjected to histologic study.

Physical changes in the ovary which may be the cause of sterility are either those which destroy the germinating epithelium or prevent the rupture of the matured Graafian follicle. An ovary subjected to chronic pelvic congestion from any cause usually develops a hyperplastic tunica albuginea which is tough and resistant. As a result, the successively matured Graafian follicles fail to rupture and appear as small retention cysts beneath the surface of the ovary. Such an ovary is found to be enlarged, tender, prolapsed, and freely movable. Organized fibrinous exudate upon the surface of the ovary or adhesion of the ovary to the surrounding viscera resulting from pelvic peritonitis will either prevent the discharge of the ovum or hinder its transit from the ovary to the tube. Even in the absence of such changes in the ovary, pelvic peritonitis and its consequent adhesions may be the cause of sterility by occluding the fimbriated extremity of the tube. The rest of the tube may not share in the inflammatory process. The starting-point of such a pelvic peritonitis may be disease of the appendix or other abdominal viscus. The previous history of the patient, in such a case, would shed much light upon the probable cause. This is especially so in "one-child sterility," in which the pelvic changes enumerated may have their origin in puerperal infection.

BIOCHEMICAL CAUSES OF STERILITY.

A most interesting phase of the subject of sterility in the female, and one which promises to shed much light upon its etiology and treatment, is that afforded by the biochemical researches of Hühner, Reynolds, and Lespinasse.[3] Hühner and Reynolds have studied the effect upon spermatozoa of the normal and pathological secretions of different parts of the female genital tract and have presented some very interesting data. The Hühner test consists in the examination of secretions from the vagina, cervix, and cavity of the uterus, beginning preferably within one-half and not later than one hour after coition, and continuing at intervals during the following twenty-four hours. First the mixture of semen and vaginal mucus is examined. In normal cases the spermatozoa remain active in the vaginal mucus for about one hour. When they have lost their motility in the vaginal secretions the cervical mucus is examined, and under normal circumstances should contain many active spermatozoa one hour after coition. At the expiration of three or four hours more the secretion from the uterine cavity is withdrawn with a specially

devised syringe, and when normal it should disclose the presence of a few actively motile spermatozoa. When active spermatozoa are found in the uterine secretion several hours after they have disappeared from the cervical mucus the test is said to be positive. Through the careful application of this test we may determine in which part of the genital canal the activity of the spermatozoa is too rapidly arrested. Acting upon the information thus obtained our search for the cause of the arrested motility and consequent sterility is more likely to be successful than by the haphazard methods heretofore employed.

If at the first examination of the mixture of semen and vaginal secretion no spermatozoa are found, the man is considered to be aspermatic; if many dead or feebly active spermatozoa are present their devitalization is to be sought in the reaction of the vaginal secretion. If spermatozoa reach the cervix in an active state and lose their motility in the cervical mucus, either the secretion of the cervix itself or that draining from the uterus is toxic. If they successfully pass through the vaginal and cervical canals but suffer arrest of motility in the cavity of the uterus, either the uterine or tubal secretions may contain the toxic agents. If repeated examinations of the uterine cavity disclose actively motile spermatozoa several hours after coition, the inference must be that the sterility (in the absence of organic lesions of the tubes and ovaries) is to be ascribed to deficient quality of ova.

Some of the alterations in the secretions which render them toxic to the spermatozoa are stated to be as follows: hyperacidity of the vaginal secretion; hypersecretion, inspissation, or infection of the cervical mucus and the presence in it of pus cells or pathogenic bacteria; the admixture of desquamated epithelium with or without bacteria in a thin, overabundant uterine secretion. The causes of such alterations are gonorrheal or other infections, deficient drainage from the cervical canal due to a pinhole size os, catarrhal changes in the cervical or uterine mucosa. The recognition of the cause is important if the proper treatment for correcting the sterility is to be instituted.

It has been proposed by Lespinasse to carry the biochemistry of sterility still further and to establish it upon a serologic basis. He explains the reason for this attempt as follows:

"It has been shown experimentally that spermatozoa, after coitus, penetrate into the abdominal cavity in large numbers. From here they are absorbed by the leucocytes, producing lytic bodies in the serum of the woman for spermatozoa and consequently rendering her sterile.

"It is also possible, but as yet unproven experimentally, that the secretions of certain women are normally agglutinative and hence destructive to the spermatozoa of one individual and not to another, thus accounting for those cases of sterility where both individuals have children by subsequent marriages. A recent test for paternity has been based on this formation of antibodies to spermatozoa. By it for medicolegal or other purposes the father of any particular babe may be determined. The test depends upon the fact that the mother and babe are sensitized to the sera or sperm of the male individual who produced the pregnancy."

FUNCTIONAL CAUSES OF STERILITY.

The perversions of function to which sterility may be ascribed consist of some not well understood processes, among which are changes in quantity or quality of the internal secretion of the ovary, disturbances in the inter-relation of the suprarenal thyroid and ovarian secretions. Such perversions or disturbances are considered to be present in those women who rapidly become fat and suffer amenorrhea. On this hypothesis may be explained the association of fat and sterility. Out of 215 cases of obesity, Kish[4] found 21 per cent sterile, and his observation coincides with that of other investigators.

Corpus luteum deficiency may exist without either amenorrhea or obesity and still be the cause of sterility.

PSYCHIC CAUSES OF STERILITY.

The relation of the sexual appetite and sexual pleasure in the sterile must be carefully considered as a whole, and especially in accounting for what is termed incompatibility as a cause of sterility.

While the evidence in favor of attributing sterility to absence of sexual emotion in women is not conclusive, there are some observations which would indicate that sexual pleasure and orgasm are powerful factors in aiding conception. In 69 cases of sterility investigated by Kish he found faulty development of voluptuousness in 38 per cent. Duncan[5] found the same condition in 31 per cent of his cases. Eulenberg[6] along with other students of this subject holds that while conception may occur if the woman is entirely passive, nevertheless active participation on the woman's part due to excitement is necessary to produce those reflex processes which render easy the passage of the spermatozoa into the uterus.

Of the reflex processes which may be assumed to accompany the orgasm, Vaertung[7] writes as follows:

"If one considers the sexual apparatus one sees that each and every part of it is concerned with aiding fertilization. While the whole process is not clear we may safely assume the following process to accompany orgasm: There is a peristaltic contraction of the vagina which holds the mass of semen against the mouth of the uterus. In these peristaltic contractions not only the vagina, the cervix, and the lower part of the uterus but also the entire uterus is apparently involved. The uterus during strong excitement, and assisted by the abdominal pressure, rises further into the pelvis, the mouth of the womb sinks lower, is opened by the uterine muscles, and ejaculates a small amount of secretion from the cervix. At the same time a sucking action is induced in the slightly opened mouth of the uterus which results in the introduction of some semen into the uterus. Rohleder[8] is of the opinion that this aspiration is the more powerful the greater the sexual excitement. In addition to this assistance must be added the action of the ciliated epithelium of the cervical canal. Summarizing the chief results of the voluptuous sensations we may note that they cause: (1) The contractions of the vagina; (2) reflex uterine activity with the corresponding aspirating action; (3) the mucous plug; (4) the activity of the ciliated epithelium; (5) an increased temperature of the entire genital apparatus."

TREATMENT.

The successful treatment of sterility in the female depends largely upon the recognition of its causative factors. Any case that seeks relief requires to be studied with infinite care in order to determine the cause or combination of causes which may be operative. Cognizance of the many complicated and baffling causes of sterility should make us hesitate to undertake its correction with the same nonchalance which has characterized most of our previous efforts in that direction.

An imperforate hymen, or one which though perforate is so tough and resistant as to prevent satisfactory sexual congress, should be either freely incised or exsected. A stenosed vagina should be overdilated under general anesthesia, either with the fingers or instrumental dilators. Subsequent contraction should be prevented by insertion of a large glass vaginal plug which should be retained for several weeks. A transverse partition forming an obstruction in the upper part of the vagina should be completely excised; the raw surfaces of the vaginal walls thus produced should be sutured to prevent the formation of adhesions and the possibility of a secondary atresia. The treatment of absent vagina with the object of correcting sterility will depend upon the condition of the uterus, tubes, and ovaries, and this is frequently difficult to determine except by direct inspection through abdominal incision. The construction of a vagina in these cases may be attempted if the other pelvic organs have been ascertained to be of normal size and structure. Sterility due to the persistence of an infantile uterus cannot be corrected.

For the purpose of overcoming sterility,

the treatment of acute anteflexion of the uterus associated with a cervix which is long, stenosed, and directed anteriorly should be undertaken only after careful consideration of the factors which are amenable to correction. Success will not result from any treatment of a small, hypoplastic uterus. Dilatation and curettement of the stenosed cervix are done for the purpose of widening the canal, securing good drainage, correcting the toxicity of the discharge, and producing a healthy cervical mucous membrane; all of these things may be accomplished, and yet dilatation and curettement, according to Kelly,[9] succeeds in overcoming sterility in less than 15 per cent of the cases in which it is done. What is the reason for such a large percentage of failures? In over 30 per cent of the cases the husband is aspermatic. In a fairly large percentage the uterus and other genital organs are hypoplastic and unfitted for conception. In some cases the cervical canal soon contracts again. In few, if any, cases do dilatation and curettement sufficiently overcome the angulation of the uterus and draw the cervix backward so that it may be bathed in the pool of semen which is deposited in the posterior vaginal fornix. In order to accomplish this, some additional operation, such as that of Dudley[10] for correcting the angulation, should be done.

If occlusion of the Fallopian tube is found to be the only barrier to the union of the spermatozoön and ovum, an attempt should be made to restore the continuity of the genital canal by operation upon the tube. The scope of this paper, however, will not permit of a detailed description of the many operative procedures which have been devised for the purpose. Salpingostomy with or without removal of a portion of the tube may suffice. Complete removal of diseased tubes without special attempt at securing a patulous genital canal has been followed by pregnancy. A woman, reported by Polak,[11] who had been sterile for many years because of gonorrheal salpingitis which developed soon after marriage, became pregnant shortly after a bilateral salpingectomy. I have recently reported two cases of pregnancy following bilateral salpingectomy, and have collected thirteen similar cases from the literature. In the surgical treatment of sterility caused by cystic degeneration of the ovary or inflammatory disease (other than abscess formation) in or around the ovary, the attempt should be made to preserve some of the ovarian tissue and attach it near the abdominal ostium of the tube.

Correction of the chemical and biological changes in the female genital secretions which are inimical to the health and life of the spermatozoa may be attempted by the following methods: Hyperacidity of the vaginal secretion may be neutralized by douches of alkalies, as sodium bicarbonate or sodium phosphate (Hühner), used just before coition; or by the introduction of suppositories of alkaline substances several hours before. The same treatment has been effective in the comparatively few instances in which the cervical mucus was found to have an acid reaction. Chronic purulent or mucopurulent cervical discharges which are found to quickly destroy the motility of the spermatozoa may be rendered less toxic by proper treatment. In the absence of laceration of the cervix and its sequelæ, such as hypertrophy and erosion, medical treatment will usually suffice to restore the cervical mucous membrane to a normally functionating state. This treatment may be pursued along well-recognized lines. In my own experience the best results have followed applications of compound solution of iodine to the cervical mucous membrane and packing the vaginal vault and cervical canal with an ointment consisting of ichthyol one part, wool-fat three parts, using one-quarter to one-half ounce at each application. This has yielded much better results than tampons or suppositories containing various medicaments in a glycerin base.

Only after a thorough trial of various methods should curettage be resorted to. All of medical treatment fails, however, in correcting the endocervicitis and its toxic discharges when hypertrophy, eversion, and

erosion of the cervix exist. These conditions demand appropriate surgical treatment, usually amputation of the cervix. A method of cervical amputation which I[12] have described and have employed in most instances has given me better results than the methods previously used. In those cases in which there is an associated obesity and amenorrhea, and in which the sterility appears to be due to lack of ovarian secretion, or to some disturbance in the relationship of the thyroid and ovarian secretions, satisfactory results are sometimes produced by the administration of dried corpus luteum substance (2 grains) combined with desiccated thyroid gland (¼ to 2 grains) three times a day. A rigid dietary and regulated exercises should be instituted. The lessons to be learned from a review of this subject would seem to be:

1. Sterility in the female may be due to many causes, some apparent and easily determined, others obscure and discovered only after careful investigation.

2. Surgical treatment for its correction should not be instituted until an honest and thorough investigation has shown that the sterility may reasonably be attributed to structural changes in the female generative organs.

3. No investigation can be considered complete which does not in some way include examination of the semen.

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HOW PHYSICIANS AND PHARMACISTS CAN CO-OPERATE IN THE USE OF AVAILABLE DRUGS.[1]

BY ROBERT P. FISCHELIS, B.Sc., PHAR.D.,
Lecturer on Commercial Pharmacy, Department of Pharmacy and Chemistry, Medico-Chirurgical College of Philadelphia.

The problem of supplying the necessary drugs for the cure and relief of the various ailments which physicians are called upon to treat is becoming increasingly difficult each day as the great world-war continues. Reports of the scarcity of some medicinal products grow continually more alarming and those who have followed the situation closely feel that perhaps "the worst is yet to come." Whether we take such a pessimistic view of the situation or not, the fact remains that many of the drugs which physicians have been accustomed to prescribe freely are now scarce, and consequently high in price.

Naturally there comes to us the question: "Why should so many drugs be scarce and high in price?" and while the answer invariably sums itself up into the statement, "because of the war," it is natural for us to dig deeper into the question and determine just how the war is affecting prices of drugs and chemicals, and what can be done to relieve the situation.

Physicians and pharmacists are expected to have the welfare of the public at heart, and to a major portion of the public that statement means supplying medical advice and prescriptions at as low a price as possible.

It is impossible to prepare and compound medicines without charging prices that are commensurate with the market value of the drugs contained in them. It may be possible, however, to lower the cost of medicines

[1]Read at the joint meeting of the Philadelphia County Medical Society and the Philadelphia Branch of the American Pharmaceutical Association, April 26, 1916.

if physicians will temporarily readjust their armamentarium and prescribe drugs which, while giving similar therapeutic action, are lower in price than some others which have been used previously. The selection of drugs used in treating diseases rests entirely with the physician, and after a prescription is once written and given to the pharmacist it is his duty to furnish the articles called for and nothing else, unless it is physically impossible to do so, and in the latter case it is the doctor who must decide what is to be used in place of the unobtainable substance. It is within the province of the pharmacist, however, to make suggestions which will tend to aid in relieving the situation, because his intimate touch with the drug market gives him first-hand knowledge as to what drugs or chemicals are scarce, unobtainable, or extremely high in price, and whether or not this condition is to continue. I do not for a moment mean to suggest that pharmacists wish to take it upon themselves to dictate to physicians what to prescribe at any time, for such is not the case, but the present situation offers an excellent opportunity for coöperation between the two professions to the interest of the public, as well as to their own interest.

In looking over the pages of the United States Dispensatory headed "Index of Diseases," we find under each ailment a list of the drugs which may be used in its treatment. Under some of these headings we have as many as one hundred suggested remedies. Surely, some of these could be eliminated at this time if necessary, and there would still be a sufficient number left to cover the needs of the practitioner. Most authorities agree that there are very few specifics in medicine. In fact, a public health official not very long ago stated that there were only three specifics known to the medical men, namely, quinine for malaria, six hundred and six for syphilis, and diphtheria antitoxin. Perhaps some of our medical friends feel that even this restricted list could be improved by the elimination of six hundred and six.

Of course it is possible that some single drug or chemical which is very high in price at present may be the only one that will answer the purpose in a certain case, but such instances will be few in number, and when they occur it will, of course, be necessary to meet the market price of the article, as is done in many cases at present when it is really unnecessary to go to such expense.

Our materia medica is such a large one and the armamentarium of most physicians is so small, comparatively, that we should find little trouble in adjusting things in some fairly satisfactory way to tide us over the era of high prices.

No doubt if this matter is discussed in gatherings such as this, numerous ideas will be brought out for meeting the situation, and it is the purpose of this paper to lead to a discussion in that direction.

It would probably be best for us to take a general survey of existing conditions with reference to drugs and chemicals, and then suggest ways and means for overcoming the difficulties which we may encounter. For this purpose we shall consider the subject under three headings, namely, vegetable drugs, inorganic chemicals, and organic chemicals.

Let us remember that before August 1, 1914, and perhaps for some little time after this date, we received shipments of dyestuffs, medicinal coal-tar derivatives, plant principles, crude drugs, and many other products for which we had learned to depend upon Europe, and particularly Germany, at frequent intervals and in any needed quantities. Let us further remember that Germany had spent years in building up this trade with us, and because of cheaper production costs, and because of inadequate United States tariff regulations, to say nothing of our antiquated patent laws, she had succeeded not only in building up her own trade, but in preventing any serious competition by manufacturers in this country.

We had been educated to use the things which Europe produced, and at the same time had been so busy supplying foreign countries with other products that we gave little thought to making ourselves indepen-

dent of Europe as far as medicinal chemicals and drugs were concerned.

The Situation Regarding Vegetable Drugs.—It is a well-known fact that certain drug plants can only be grown in climates particularly fitted for their propagation, and we are accustomed to speaking of plants as being "native" to this or that country. Experiments in drug-plant cultivation in recent years have shown us, however, that artificial conditions can often be created which will permit the propagation of certain plants in localities other than their native habitat.

It stands to reason that with the embargo on drugs issued by the several European powers and the lack of shipping facilities we are unable to obtain fresh supplies of crude drugs which are native to these countries. Of course we had a stock of these drugs on hand when the war began, but this has gradually been depleted, and in many cases is exhausted. American manufacturers of pharmaceuticals have been equal to the occasion, at least in some respects, for they have grown such drugs as cannabis, belladonna, hyoscyamus, stramonium, digitalis, hydrastis, and others in sufficient quantities for our consumption, and it is probably safe to predict that other needed drugs will be grown here this summer. As our stock of crude drugs became scarcer the market prices naturally advanced, and it cannot be expected that domestic production will return prices to their former levels because drugs cannot be cultivated as cheaply here as they can be bought from foreign countries. We must bear in mind that labor is much higher in the United States, and that the cultivation of a plant costs a great deal more than merely collecting it where it grows practically wild.

The Situation Regarding Inorganic Chemicals.—When we speak of inorganic chemicals in relation to their use in medicine, we mean that vast number of inorganic salts which have attained a prominent place in our materia medica and include, for example, the bromides, iodides, sulphates, chlorides, chlorates, etc., of the various metals. In the preparation of each of these salts we must have some substance which furnishes to us the metal, and some substance which furnishes to us the proper acid radical. Sulphuric acid, nitric acid, hydrochloric acid, and other acids have been and are produced in the United States in large quantities, and there should not be any shortage of these. We have our Louisiana sulphur beds to furnish the crude material for making sulphuric acid. Nitric acid is still made mostly from Chili saltpetre or sodium nitrate. Unfortunately we are having trouble in getting this substance because of a lack of ships, but Germany has taught us how to do without sodium nitrate and make nitric acid from the nitrogen of the atmosphere, and it is our understanding that a concern has been organized in the South which is about to undertake the manufacture of nitric acid in this manner. We have a plentiful supply of sodium chloride from which to make hydrochloric acid. Practically all acids are dependent for their manufacture upon sulphuric acid, and as long as we can make sulphuric acid we can make inorganic chemical salts, provided the proper metals are also available.

But in spite of the fact that we make sulphuric acid and other acids in an abundant supply their prices have gone up, and when acids go up in price their salts naturally follow suit. The reason for this increase is that sulphuric and other acids are used in the manufacture of explosives, and the exporting of acid to Europe has been so profitable that those who wanted to buy it for making salts had to pay "war prices" or do without it.

When we come to the consideration of the metals necessary to produce these inorganic salts, we find that iron, copper, silver, and lead are found in larger quantities in this country than in any other. Of gold, zinc, nickel, and cobalt we have more than enough to meet our requirements. We are only just beginning to use our deposits of other metals, such as bismuth, and as for our supply of halogens, we have the natural brine from the earth which furnishes chlorine and bromine, and our Pacific coast, or rather the ocean itself, is producing

annually for us great crops of kelp or seaweed which furnishes iodine. Iodine is also obtained as a by-product in the conversion of Chili nitre to nitric acid. Unfortunately, bromine and chlorine are now used in large quantities abroad in preparing asphyxiating gases for the gas bombs and grenades of which we read so much. This has created a demand for these halogens, and naturally has increased their market value, causing bromides to advance as much as 1000 per cent. There is also a brisk foreign demand for various metals, and here again the result is high prices.

The rôle of iodine in the war has been of a more kindly nature than that of its sister halogens. Its use as an antiseptic on the battle-field is universal.

Potassium is the metal which has caused us greatest difficulty. Practically the only readily workable potash deposits of any magnitude so far as known are located in Germany, and our supply of German potash salts is cut off entirely. Consequently these salts have been high in price for some time. We have supplies of potassium in the United States, but as yet we have been unable to devise satisfactory methods of extracting the potassium from the deposits found in the various sections of our country. Feldspar, a very common rock, contains considerable potash, but it remains as yet "unconquered." Alunite, another potash-bearing mineral, is being successfully worked by one of our new manufacturing enterprises. Tobacco stems, which were previously considered as so much waste, have yielded a goodly portion of the coveted metal in the past year, and from these various sources we have been able to supply some potash salts, but we have by no means met the demand. Salts of potassium are therefore very high in price.

The situation with regard to potash furnishes an excellent example of what physicians can do in the way of lowering the prices of prescriptions. It is well known that excepting for purely laboratory purposes the sodium salts can and will freely and admirably replace corresponding potassium salts. If, therefore, sodium salts will be prescribed where potassium salts were previously used, the situation will be ameliorated considerably. Medicinally sodium salts are believed to be even superior to potassium salts because the consensus of opinion accredits the potassium ion with a depressing action on the central nervous system and heart, while the sodium ion is perfectly inert and harmless. When a physician prescribes potassium iodide or potassium bromide he wants the effect of the iodine or chlorine radical; certainly not the effect of the potassium. If the chlorine and bromine can be conveyed satisfactorily in the form of sodium salts there is no reason why they should not be used, and their doses are practically the same.

The Situation Regarding Organic Chemicals.—In discussing the scarcity of organic chemicals our attention is first directed to the coal-tar derivatives such as acetanilide, acetphenetidin, salol, salicylates, benzoates, etc.

In the great iron and steel industries of the world vast quantities of coal have to be partially burned to coke. In this process large quantities of valuable by-products are driven off and can be collected and used for many purposes, both in the peaceful arts and in war. To our shame be it said that we have for the most part, by the use of the open beehive-shaped ovens, allowed these valuable by-products to escape into the air and be lost. One at least of the good things that the present war is accomplishing is to show us the folly of such insane waste of valuable material. The substitution of the open type of coke oven by the enclosed by-product recovery oven is now being generally undertaken.

Among the coke recovery products we obtain coal tar, and while we have in the past produced considerable quantities of coal tar and are producing more at present, we have never built up a coal-tar chemical industry, but have, with few exceptions, confined our efforts to selling the crude tar and the simpler derivatives generally known as intermediates.

German chemists on the other hand spent years in devising means of converting the crude coal tar into valuable organic compounds such as the synthetic dyes, and the

group of synthetic medicinal products so well known to all of us, and now either off the market or commanding exorbitant prices.

Unfortunately, coal tar and the coal-tar intermediates, while furnishing valuable medicinal products, are also the basis of high explosive compounds, and American capital and labor are busy just at present in turning out the coal-tar products necessary to keep up Europe's work of destruction, rather than in building up a coal-tar chemical industry.

The general attitude of American manufacturers seems to be one of "making hay while the sun shines." They are afraid of tying up capital in fostering an industry which, after the war, may be inadequately protected by our government against the influx of foreign goods which is bound to come, and judging by our present patent laws, tariffs, etc., there is ground for such a view of the situation. There is little hope of an immediate adequate supply of the coal-tar synthetics from domestic sources.

As for other organic chemicals used in medicine, we may point to the fact that our unmeasured cereal crops furnish us grain alcohol and ether; from our forests we obtain wood alcohol, acetone, acetic acid, rosin, and turpentine. We have also the raw materials for oxalic, lactic, citric, and tartaric acids.

There remains one important class of compounds to be considered, namely, the alkaloids and other plant principles. Many of these compounds have been made abroad exclusively, and are not only high in price but may soon be unobtainable.

There was a time in the history of medicine and pharmacy—and it is not so far back—when active principles isolated from vegetable drugs were practically unknown. In those days tinctures, extracts, infusions, etc., were used exclusively when drug preparations were desired, and they produced results.

Professor A. Tchirch, the well-known pharmacognocist of the University of Berne, Switzerland, has said:

"Under the influence of the successes of the modern synthesis of medicaments, we have been gradually abandoning drugs, in spite of experiments carried on for hundreds of years. Many physicians have already disaccustomed themselves to the use of drugs.

"How can one replace rhubarb by a solution of emodin, ipecac by emetine, opium by morphine, digitalis by digitoxin, ergot by ergotoxine or by the interesting bases isolated by Barger and Dale, which, according to the recent experiments of Kehrer, do not even act on the uterus? Emodin, emetine, quinine, digitoxin, and morphine are pharmacological individuals, different from the drugs themselves, and should be numbered among remedies not to replace the drugs, but to stand beside them."

A comparison of the percentage of increase in a few active principles and drugs based on a comparison of prices obtaining about March 1, 1916, and June 1, 1914, might be of interest at this point.

It must be borne in mind, however, that all price comparisons are more or less uncertain at this time, and the lapse of a few weeks, or even days, may make an enormous difference in the price quoted for an article. Between the dates mentioned

Granulated opium has increased	58 per cent.
Morphine has increased	16 per cent.
Codeine has increased	10 per cent.
Cinchona has increased	40 per cent.
Quinine has increased	180 per cent.
Coca has increased	20 per cent.
Cocaine hydrochloride	45 per cent.
Nux vomica has increased	33 per cent.
Strychnine has increased	67 per cent.
Aconite has increased	59 per cent.
Aconitine has increased	40 per cent.
Belladonna has increased	350 per cent.
Atropine has increased	1000 per cent.

These are only a few examples, and while they may not appeal to you as particularly striking in some instances, we must remember that, with a few exceptions, the crude drug stocks in this country at present are used to a much greater extent for manufacturing galenicals than for extracting active principles. There is, therefore, more danger of a shortage of active principles than there is danger of a shortage of drug preparations. The danger of shortage of galenicals is still further minimized by the

fact that many of our important drugs are being cultivated, as already mentioned. These domestic crops are not sufficiently large as yet for the extraction of alkaloids, but they do cover our needs for the manufacture of tinctures and other galenicals.

The great objection that has been voiced to galenical preparations in some quarters is that galenicals are not dependable because of the variation in active-principle content of drugs. Modern methods of drug cultivation, manufacture, assay, standardization, and preservation overcome this objection in a large measure, if not entirely. When a vegetable drug is assayed, either chemically or physiologically, or where possible by both methods, one may rest assured that the strength of that drug is known, and when such a drug is used to make a tincture, fluid extract, or extract, and the resulting product is again assayed, one may be assured that something is known of the strength of the finished product. Modern pharmaceutical methods carry us still further, however, for after completing the assay of a preparation we adjust its strength to standards given in the Pharmacopœia or otherwise recognized, and then the physician who prescribes a dose of 10 minims of a standardized tincture, or 1 grain of a standardized powdered extract, knows just exactly how much active principle his patient will receive.

Another objection to the use of galenicals which is advanced occasionally is that their taste is unpleasant. Let it not be forgotten that the pharmacist is still capable of compounding medicines and suggesting means of disguising their unpleasant taste. If asked, he will suggest suitable adjuvants, diluents, and flavoring agents to disguise the taste of tinctures. He will recall to the mind of the doctor that the doses of fluid extracts are so small that it is often convenient to incorporate them into a pill mass, and that this mass can either be divided and enclosed in capsules, or divided and rolled into pills which can be coated to preserve them until used.

Again, standardized powdered extracts of drugs give very satisfactory results, and mixed with sugar of milk, or some other diluent, they can be put up into capsules just as easily as active principles can be similarly dispensed.

Of course galenicals cannot replace active principles for hypodermic use, and in cases in which the crude drug is scarce, or commands exorbitant prices, it may be advantageous to use the active principle for oral administration also. Taken on the whole, however, the writer believes it would be of considerable advantage for physicians to prescribe galenicals wherever possible, in place of the active principles of drugs, for the time being.

The months which have hurriedly passed since the outbreak of the European war have witnessed marvelous efforts and results toward making our country independent of others in supplies of drugs and chemicals, but Rome was not built in a day, and neither was Germany's chemical industry. Patient effort, confidence in the future, and some assurance of governmental protection and aid are needed to build up our industries in this field. In the interim we must make the best of the situation.

It seems that the furnishing of material used exclusively in the treatment of disease cannot be disassociated from ordinary commerce, and is therefore subject to the practices of war and the arbitrary rulings of belligerents. Every one of us here feels that such should not be the case, but these conditions will never be altered unless we coöperate in testifying to what extent the work of healing is now hampered by the lack of proper therapeutic agents.

It is reported that on rare occasions Germany has raised her embargo and Great Britain has granted a permit enabling the importation of limited amounts of much-needed drugs, thereby recognizing the humanitarian principle involved. Could we not unite in asking that such occasions be brought about more frequently?

Let us as physicians and pharmacists coöperate in adjusting our materia medica to the conditions of the hour, but let us at the same time endeavor to obtain recognition for the principles of humanity as above those of Mammon and war.

EDITORIAL.

DIET AND RENAL DISEASE.

Readers of the THERAPEUTIC GAZETTE will recall the fact that on a number of occasions we have raised the question in these columns as to whether it is essential or wise to place all cases of chronic nephritis on a rigid non-nitrogenous diet. We have taken the ground that in a goodly proportion of such patients such a course is unwise, since it is advantageous to maintain the nutritional equilibrium if possible in every one, and also because it has yet to be proved that a non-nitrogenous diet is essential, and, again, the use of a moderate quantity of protein food serves to maintain strength and to compensate for the loss of albumin in the urine. We think that the readers of the GAZETTE will be interested in a contribution which is made to the *Edinburgh Medical Journal* for April, 1916, by Boyd, in which he shows very conclusively that a decision as to the use of a non-nitrogenous diet is to be reached, not by an examination of the urine, or even by an estimation of renal activity through the use of different tests, but by an estimation of the blood nitrogen which is present. Concluding his article he uses these words: "In chronic nephritis dietetic treatment must largely be governed by an estimation of blood nitrogen. If there be no nitrogen retention it is inadvisable to keep the patient on a strict non-protein diet, as nutrition suffers. Short periods of nitrogen-free diet are often useful and beneficial to the renal function and the cardiovascular symptoms, but the patient's nutrition must always be kept in view." These sentences, it seems to us, are pregnant with meaning and deserve careful consideration, individually and collectively.

It will be recalled that nitrogen exists in the blood in the protein and non-protein form. The protein form is found in the serum-albumin and the serum-globulin of the serum. The non-protein nitrogen is made up in greater part of urea, uric acid, and other bodies, of which the chief is urea. The estimation of the non-protein nitrogen of the blood by the older methods was more or less laborious and often erroneous as to results, whereas the plan introduced by Folin simplifies matters greatly. According to Folin and Dennis the non-protein nitrogen of the blood in health stands at from 22 to 26 milligrammes in 100 cubic centimeters, although these figures vary considerably when influenced by diet and in conditions of the kidneys which are not primarily renal in origin, as, for example, in cardiac disease with secondary renal congestion, when the non-protein nitrogen may be as high as 32 to 36. In cases of renal disease, however, the percentage is very much higher. On the other hand, it must not be forgotten that hospital patients, in particular, on entering an institution not infrequently receive so great an increase in animal food, over and above that to which they are accustomed, that there may be a very great increase in the non-protein nitrogen of the blood without renal disease being entirely responsible for it. Apparently we reach the conclusion, from Boyd's investigation, that the content of non-protein nitrogen is not to be considered dangerous or indicative of threatened uremia, or even of the necessity of cutting down nitrogenous diet, unless the percentage gets in the neighborhood of 50. If it is between 50 to 100 milligrammes per cent the patient must be considered as suffering from a very definite and serious nitrogen retention. Boyd shows this in an interesting way in some tables in which the non-protein nitrogen varied from 54 to 228. In all of the cases with high estimations death occurred. Boyd makes the important statement that in the non-protein nitrogen cases which show above 100 milligrammes per cent the duration of the illness may be reckoned in days, seldom in weeks.

In the further consideration of this subject Boyd also takes up the discussion of the relationship of nitrogen concentration in the blood and the cause of the uremic phenomena. He first points out that urea occurs in all the organs and tissues in the body except in the fat and the tissues of the

urinary tract, and that when its quantity rises in the blood the kidney cells are stimulated to increased activity. Furthermore, it has been shown to be a non-toxic substance when injected, unless the doses are enormous, indicating that urea is not the only, or the chief, toxic agent in uremia. On the other hand, it seems to have been shown pretty clearly that the difficulty lies in impaired oxidation of the purin group to uric acid. In the course of such imperfect oxidation methyl-guanidin is developed; that is a poisonous substance capable of producing death, with symptoms closely resembling uremia and eclampsia. So, too, creatinin when properly oxidized changes into methyl-urea, while when the oxidation is poor it forms methyl-guanidin. Boyd is careful to point out, however, that sometimes severe uremic attacks occur in nephritic cases even when an estimation of the blood nitrogen shows it to be so low that uremia might be thought to be little likely to occur.

This investigator also publishes an interesting table of 22 cases of various forms of nephritis, showing the relationship between the nitrogen per cent and the systolic blood-pressure. His conclusions are in accord with those of Folin, Dennis, and Seymour, to the effect that there is no definite relationship between high blood-pressure and the degree of nitrogen retention. Thus, in one case of blood-pressure of 220 milligrammes the blood nitrogen was only 41 milligrammes per cent, and in another case of 218 milligrammes the blood nitrogen was 60 milligrammes per cent. He therefore concludes that whatever toxic agent underlies the hypertonus of nephritis, it is not due to gross nitrogenous retention, and he makes the important observation that the mere existence of high blood-pressure is not a necessary indication for a strict non-protein diet. We have seen so many cases of nephritis in which the strength of the patient has materially improved when he has been allowed a fairly free protein diet that we wish to call particular attention to this observation of Boyd.

Concerning the relationship between blood nitrogen and renal activity Boyd is in accord with Folin, Dennis, and Seymour in finding that there is no correspondence between the results of the phthalein test and the degree of waste nitrogen retention. He publishes a table of nine cases of nephritis in which he shows that a considerable nitrogen retention is possible with a fairly active phthalein excretion, and that a low phthalein excretion may occur with a scarcely appreciable nitrogen retention. However, when nitrogen retention is above 100 milligrammes per cent the phthalein excretion in two hours is almost *nil,* whereas in health it will be remembered that from 80 to 90 per cent of it may be excreted in this time.

As a result of this investigation Boyd writes these conclusions:

1. That nitrogen retention does not occur in all nephritics.

2. That when the non-protein nitrogen of the blood rises to 50 mgs. per cent it is a distinct warning of grave renal inadequacy, and is an urgent call for rigid non-nitrogenous regimen.

3. That nitrogen values round about or over 100 mgs. per cent justify the gravest prognosis.

4. That there is no definite relationship between nitrogenous retention and high blood-pressure.

5. That the estimation of the non-protein nitrogen of the blood is of great clinical value as a guide to prognosis and to treatment in all cases of nephritis.

Boyd gives the following advice as to treatment:

"The treatment of nitrogen retention must be principally dietetic. When a nephritic with nitrogen retention comes under observation it is well, if strength permits, to withdraw all nourishment, satisfy thirst with distilled water, and administer purgatives. Considerable nitrogenous waste can be withdrawn by the bowel. Hot-air baths or hot packs are of value.

"After a period of twenty-four hours' rest non-protein diet is commenced, consisting of water-arrowroot, cream, sugar, and such stewed fruits as are poor in benzoic acid, *e.g.* apples, prunes, figs. This diet can be kept up for a week or even two weeks with-

out the patient suffering. It supplies sufficient energy for the bodily requirements, and if nitrogen retention is not excessive may cause a definite fall in blood nitrogen. At the end of the period milk may be added and more inspiring farinaceous foods than water-arrowroot. In the early stages of an acute nephritis, even when there is no nitrogen retention, such a diet is always desirable, for even though the kidney may be able to excrete waste nitrogenous bodies, in doing so it is working, not resting, and work is not good for an organ in an active state of inflammation."

Investigations of this kind are not only of value because they point the way to correct practice in individual patients, but they are also of value because they throw light upon a field which has hitherto been enshrouded, to a large extent, in darkness, and, again, because they emphasize the importance of associating physiological chemistry with clinical medicine if the proper guidance of a patient is to be attained.

ACETONURIA AND ITS INDICATIONS FOR TREATMENT.

Clinical investigation has within the last few years shown very clearly that acetonuria is a very much more prevalent condition than was generally supposed in earlier times. Instead of its being considered chiefly as a manifestation of advanced diabetes, it is now known to occur under a large number of diverse conditions, varying from postanesthetic chloroform poisoning to cases of pernicious vomiting arising from any cause; cases of starvation, voluntarily or involuntarily induced; fevers with considerable waste, or breakdown of the tissues of the body; and in certain cases of excessive diarrhea, as is frequently seen in infants during the hot summer months. It has also been found to be fairly constant in the severe acute infections, such as pneumonia and other febrile maladies. It has been suggested that whenever symptoms of so-called acidosis develop the patient is to receive by the bowel, by the mouth, or even intravenously and subcutaneously, solutions of carbohydrate substances, notably dextrose or levulose, in order that acidosis may be prevented by providing the body with so much foodstuff that it will not split and utilize its own tissues.

A number of papers have appeared within the last few months pointing out the value of this method of treatment in cases of "summer complaint" when the child has somewhat hurried respiration and a tendency to stupor, and still more recently a paper has appeared in the *Medical Record* of April 8, 1916, by Blodgett in which he records the results which he has obtained in investigating acetonuria in conditions other than diabetes. After pointing out that he has met with it in a marked form in all cases of severe vomiting, postoperative or otherwise, he expresses the belief that the symptom of vomiting is a result of the acidosis rather than its cause. Out of 44 cases of scarlet fever, which he considered in every way favorable to his investigations, there were 29 with a record of vomiting, and of these 27 had acetone in the urine. Among 15 cases that did not vomit there were 13 patients who had acetone in the urine. In measles there was practically no acetonuria, but in 18 cases of diphtheria, 8 of which had vomiting, 7 showed acetone. In 10 cases of diphtheria with no record of vomiting, 5 had acetone.

Simultaneously there appeared in the *American Journal of Diseases of Children* for April, 1916, a paper by Veeder and Johnston upon the "Presence of Ketones and Betahydroxybutyric Acid in the Urine of Normal Children." This paper is in the nature of a control and illustrates very well the necessity of considering the quantity of acetone which is eliminated rather than the mere fact of its presence, since, as we have already stated, it is becoming increasingly obvious that acetonuria is much more common than was thought at one time. Veeder and Johnston, as a result of their investigation, find that small amounts of ketones and betahydroxybutyric acid were always found in the urine of normal children, even when their caloric requirements were fully covered by a diet. Although the quantities

were small, nevertheless they could be readily estimated, the average amount excreted being, in each twenty-four hours, from 50 to 80 milligrammes. They found that age, sex, and body weight of the child apparently had no effect upon the amount, and that as a rule the amount of betahydroxybutyric acid was somewhat greater than the amount of ketones, although this did not always hold true. In other words, small amounts of these substances are to be considered normal and not evidences of a pathological condition. Veeder and Johnston even go so far as to emphasize the point that the large quantity of acetone bodies in the urine in febrile conditions and on restricted diets is due to an increase of substances normally present, rather than to the appearance of abnormal substances.

The mere presence, therefore, of acetone in the urine of a sick person or a sick child does not indicate that free feeding with carbohydrates is essential. If symptoms of acidosis exist, such as hurried breathing and tendency to stupor, and the reaction for acetone is very marked, this treatment may be essential, but otherwise it may be unnecessary.

Perhaps the most important part of these researches is to illustrate the fact that conclusions as to pathological states should not be reached, and treatment instituted in consequence, unless the physician is quite sure that the state which he has discovered was not present in a considerable degree when the patient was in health.

FRACTURE OF THE NECK OF THE FEMUR.

This injury, concerning which much new knowledge has come through the use of *x*-rays and through a more careful following of ultimate results, still remains one in which immediate treatment is often unsatisfactory, and one in which middle-aged and elderly men and women sustain permanent and crippling disability. Nor has treatment by abduction, by open operation, or by double and triple traction reached such a stage of perfection that in a given case, excepting in youth, any surgeon is reasonably certain of a good result. In this relation McGlannan's (*Surgery, Gynecology and Obstetrics,* March, 1916) study of the end results in 55 cases observed during the past eight years is of interest. Seven could not be traced. Of the remainder 17 are dead and four are helpless either on crutches or in wheel-chairs as the result of the fracture. There were 46 recent and nine old fractures in the series. Thirty-six recent cases were treated and 10 were not. Four patients died during the treatment, 13 were completely cured. Of the 36 recent fractures but five were subcapital (through the neck just below the head). The first, a woman seventy-one years old, was totally disabled for fifty-four days and partially disabled for four months. She was described seven years after her injury as living, well, and active, without handicap. The second was a woman sixty-five years old. She was completely disabled for nine months. She exhibited shortening, but was as well and active as before. The third was a schoolboy, sixteen years old, who was disabled 240 days. There was no permanent disability, and he died some four years later of pneumonia. The fourth was a woman seventy years old, who died in fifty-nine days of nephritis. The fifth was a woman fifty-six years old. She was incapacitated for six months, partially disabled for a year. Six years later she was reported as walking without crutches, with no shortening or stiffness of the hip, the major complication being obesity.

Lexer is quoted to the effect that the blood supply of the head and neck of the femur enters at four points: the first, an epiphyseal artery, at the insertion of the ligamentum teres; a second just at the line of junction of the head and neck on the upper surface; a third near the great trochanter; and finally, a metaphyseal artery near the lesser trochanter. Lexer states that the blood supply is greatest in childhood, and that in adult life the most marked change is seen in the diaphyseal group of arteries supplying the shaft, which

become smaller and smaller with advancing age.

All these arteries reach the bone by way of the periosteum and the capsule. Hence the importance of any attached and untorn area of these membranes is at once apparent.

Accurate approximation offers the best chance for a good union, diminishing the need for new bone formation, and thus giving the best opportunity for improvement in the local circulation. Reduction of a fracture is accomplished by downward traction and internal rotation of the femur, with the limb slightly flexed and widely abducted.

Whitman's forced abduction method has been condemned on the ground that the wide abduction is not required for all types of these fractures, and that overabduction would lead to malposition of the fragments. Operation demonstrates the fact that abduction is essential to apposition, and that after this point has been reached further abduction does not disarrange the fragments, because the taut capsule and other soft parts carry both fragments together to the limit of movement.

Impaction is usually a penetration with crushing and little fixation. Usually the bones are driven into one another with adduction of the limb. Union in this position therefore gives great deformity and is the cause of most of the disability incident to fracture of the neck of the femur. Though union takes place it is not a very useful one. Hence the impaction should be broken up by gentle hinge-like motion whenever there is hope of treating the patient.

In non-union of old fractures the head may be excised and the neck fragment or trochanter placed in the acetabulum, or the ends of the fragments may be freshened and put in apposition for bony union. Other alternative means are suggested that have not proved largely serviceable in practice. Subtrochanteric osteotomy is usually done when the fracture has united with deformity.

McGlannan's paper accentuates certain points concerning these troublesome fractures: First, that union and union in good position is possible; that there is as yet no standard method of treatment; that even when union takes place crippling is long continued; that union does not prevent permanent crippling; and that many of these fractures do not unite.

This paper does not call attention to the atrophy of the neck of the bone which takes place in subcapital fractures, even though these fractures be originally impacted in good position; nor does it deal extensively with the newer thought concerning the use of bone pegs with proper retention apparatus.

THE DIAGNOSIS OF FRACTURE BY PHYSICAL EXAMINATION VERSUS SKIAGRAPHY.

The ease and completeness with which fractures are diagnosed by the use of Roentgen rays, and the absence of any unnecessary traumatism incident to this procedure, have induced in the minds of those who have at their immediate disposal a modern surgical plant a neglect of those methods of examination on which the older surgeon had to rely entirely for his diagnosis, and on which even at the present day perhaps the majority of practicing physicians must still depend, since the transportation of patients to a surgical center is often difficult, at times impossible. The expense incident to the taking of an *x*-ray plus transportation may be prohibitive, and if patients be subjected to this inconvenience and expense with negative findings they may be left with a feeling of distrust in the judgment of the physician whose advice they have followed.

Skillern's paper (*Interstate Medical Journal*, April, 1916) upon this subject is therefore timely. He thus describes the humane and artful method of examining for fracture:

The patient is requested to be seated and to review the events which led to the injury. He is then asked if the limb has been fractured or diseased previously. After having visualized the mechanism of the injury from the narrative, the surgeon requests the patient to reveal the sound as well as the

injured limb. He then searches for deformity, and if this should be present the physical examination is forthwith terminated. This is an example of masterly inactivity. In the absence of deformity he is justified in running one finger-tip firmly along the most superficial portion of the bone until one spot is encountered where the patient "winces"—screwing his face up and involuntarily withdrawing the limb: wherever that spot is a fracture exists in 90 per cent of cases. Skillern prefers the term "wincing" to "localized" because it is so much more expressive. True "wincing" tenderness is almost pathognomonic of fracture, especially when combined with an accurate history of the mechanism of the injury. The patient does seriously object to the momentary pain of "wincing" tenderness.

Now right here the examiner should stop; he has made his diagnosis and should not shock the patient by further efforts. If he feels that he must elicit preternatural mobility and crepitus let him do so under nitrous oxide gas; the deformity may be reduced at the same time. The surgeon who reduces a fracture without an anesthetic, in the absence of a contraindication against one, is in the writer's opinion a brute. He cannot deliberate when the patient is conscious, and work without deliberation is not thorough work, and work that is not thorough is liable to lead to the court-room.

A skiagram must be considered merely as one of the many signs of fracture. Skillern records one case in which he requested seven skiagrams before the fracture was revealed graphically.

As to the diagnosis of contusion, he believes that herein lies one of the biggest fallacies of the day. Contusion of the bone is a rare traumatic bone lesion: difficult to recognize because it presupposes that every other possible bone lesion has been excluded both by physical examination and by skiagrams; rare because dispensary records show but few contusions of bone during the course of a year, but many fractures.

The average patient is not going to the trouble and expense of consulting his physician for a contusion, but either ignores it or treats it with the historic arnica.

Skepticism is expressed as to the existence of what is commonly called "sprain," these injuries when sufficiently severe being regarded as probably due to a spicule of cortex corresponding to the insertion of a ligament avulsed from the bone. This spicule may be too minute to be revealed by skiagraphy. The puffy wrist-joint which is so commonly spoken of as a "sprained wrist" is in reality a traumatic synovitis produced by overstretching the synovial layer of the capsule. All these cases are best treated by physiological rest such as that afforded by a splint.

In this article there is sound common sense. Skillern has called attention to the fact, well known to every largely experienced surgeon, that following trauma persistent bone tenderness usually indicates a break, bone tenderness being that elicited best by deep pressure, rather sharply localized and growing worse the longer the pressure is continued.

As a further suggestive sign of fracture, marked swelling is always to be considered. Bone bleeding is slow but continuous; that due to tear of the vessels in the soft tissues is more rapid, but is promptly arrested.

Finally, it is essentially wise, having made the general diagnosis, to refrain from further trauma until all preparations are made for reduction and retention, this being accomplished by open operation if needful, and as soon after the operation as practicable.

REPORTS ON THERAPEUTIC PROGRESS.

ANTIDOTES IN MERCURIC CHLORIDE POISONING—AN EXPERIMENTAL STUDY.

In the *Official Bulletin of the Chicago Medical Society* of April 8, 1916, FANTUS is reported to have said that the great uncertainty of interpretation of clinical results, coupled with the necessity of determining what antidote offers the patient the best chance for recovery, suggested his research.

The rabbit was chosen in this investigation, as this animal's inability to vomit enables one to rely upon the retention of the dose.

The mercuric chloride was administered in one-per-cent solution, by means of a stomach-tube, to rabbits that had not been starved. Choosing 0.04 gm. per kg. as the smallest dose that was followed by a reasonably short lethal period, average three days, the author performed a sufficient number of experiments (nine) to enable him to feel confident that he had a certainly fatal dose, and that the lethal period was not subject to great variation.

An important question that had to be settled as the next step in experimentation was to determine the influence of dilution upon the phenomena of poisoning; for, in giving the antidote, it is frequently necessary to introduce with it a considerable amount of water. The results of the experiments to determine this factor showed that dilution up to 1:1000 had no marked effect upon the lethal period.

The first step taken in testing a proposed antidote was to administer it mixed with the poison. Obviously, if the resulting mixture was found to be quite as toxic as the poison given alone, it was unnecessary to go further in the study of that substance. If, on the other hand, it was found that animals survived the fatal period by a considerable time, then the antidote was administered immediately after the poison had been injected into the stomach. If the substance proved of marked antidotal value when given immediately after the administration of the poison, then it was given five, ten, and fifteen minutes afterward, to see whether it is likely to be of use under the conditions prevailing in practice. The chief item to be noted in the estimation of results is the period of survival of animal after the poison was given. This is given in number of days.

While milk and serum-albumen solution gave no antidotal results, the majority of the animals survived when egg-albumen was given mixed with the poison. When egg-albumen was administered immediately after the poison was given, and without removing the stomach-tube, the average fatal period was 19.2 days. When, however, the antidote was given five, ten, and fifteen minutes after the poison, no antidotal effect was obtained. Inasmuch as these are the conditions that prevail in practice, we must conclude that egg-albumen is not likely to be of any value in the treatment of mercuric chloride poisoning.

Hall advanced the apparently ingenious suggestion of reversing Mayer's reagent for the precipitation of mercury. The author's experiments, however, showed that it has no antidotal value.

Alkali having been suggested as antidote, sodium carbonate and sodium bicarbonate were tried. Sodium carbonate has no antidotal value. With sodium bicarbonate a moderate antidotal effect was obtained. With sodium acetate a decidedly antidotal effect was obtained, ranking somewhat higher than that of sodium bicarbonate or of egg-albumen.

Lambert and Patterson recently reported on a highly successful method of treatment of corrosive sublimate poisoning, by means of which they scored 100 per cent recoveries in the ten cases treated by them. The treatment consists chiefly of a powerful appeal to the emunctories, a veritable washing out of the system. The drug used by them per stomach was potassium bitartrate. Experiments were performed which showed that potassium bitartrate has practically no antidotal value.

In view of the report of Macht, that

sodium sulphate was of value in phenol poisoning, and that sodium sulphate is an excellent deflocculent for proteids, it was tried; but gave perfectly negative results.

Calcium sulphide was found too toxic.

Thomas A. Carter announced in 1914 an antidote composed of sodium phosphite, six parts, and sodium acetate, four parts. The author first administered the sodium phosphite mixed with and following a fatal dose of mercuric chloride, without obtaining any antidotal effect. He then mixed it with a liberal excess of sodium acetate, which had previously been found to have an antidotal value; but found that the combination was devoid of antidotal action. Experimenting then with the proportions given by Carter, using 10 parts of sodium phosphite to 6.6 parts of sodium acetate, the author obtained a most gratifying antidotal effect, even if the antidote was given after the poison was administered.

Combination of sodium hypophosphite with sodium acetate in proportion of 10 to 6.6 gave a somewhat lower average than was obtained with Carter's antidote, 37.6 as compared with 42.2. An excess of sodium acetate, added to the hypophosphite, lowers the average lethal period, as it did in case of phosphite.

The best results of all were obtained with sodium hypophosphite to which a moderate amount of hydrogen peroxide was added (five times as much). The average lethal period, when this antidote was administered after the poison, was 43.4 days.

As the result of his studies, he would recommend the following treatment for mercuric chloride poisoning:

1. Immediate administration of antidote, *e.g.*, Carter's antidote, a tablet composed of sodium phosphite 0.36 gm. and sodium acetate 0.24 gm. If this be not available the author would give the following dose: Sodium hypophosphite, 1 gm.; water, 10 mils; hydrogen peroxide, 5 mils. If the amount of the poison taken be known, ten times as much of the hypophosphite should be given as poison was taken. This should immediately be followed by:

2. Copious gastric lavage with a 3-per-cent sodium bicarbonate solution, to which 0.50 gm. of sodium hypophosphite might be added. This may be followed by a dose of the antidote which is to be retained. This procedure should be repeated every eight hours, until no trace of the mercury can be discovered in the gastric contents by Vogel's test for mercury.

3. Egg-albumen water, 1 tumblerful every two hours. Sodium acetate, 2.0 gm. in a tumblerful of water with a tablespoonful of lactose every two hours. A tumblerful of one or the other is given every hour.

4. Continuous drop-by-drop irrigation of the colon with sodium acetate solution, 8.0 gm. per liter, interrupted twice daily by high colonic flushing with gallons of 3-per-cent sodium bicarbonate solution.

5. A hot wet pack once daily.

This treatment should be continued until the urine is free from mercury and remains so for several consecutive days.

PITUITARY EXTRACT IN OBSTETRICS.

KINNEAR states in the *Canadian Practitioner and Review* for April, 1916, that he has had both good and bad results with the use of pituitary extract in the first stage of labor, so that he now has abandoned its use for induction of labor and also before the cervix is dilated, or if he uses it does so with a certain amount of fear. [So has, and does, every one.—ED.]

It is in the second stage of labor that he gets the best results, especially if the patient is a multipara, and one only requires a few good strong pains to deliver the child. The child is born while the uterus is still acting under the effect of the pituitary, the placenta is detached quicker than usual, and the patient does not lose as much blood as formerly. Kinnear's experience is that one gets a good result if the child is born within a few minutes after its administration, but a bad result if the patient is delivered after the effect of the pituitary has worn off.

In cases of slight contraction at the brim, so that the head sticks above the brim, one may get a good or bad result from its use; good if the head comes through the brim

and is soon born, or delivered with forceps when the head is in the perineum while the uterus is still under the influence of the pituitary. If, however, the head does not come through, the uterus is apt (if the patient has been a long time in labor) to have tetanic spasm. If now one delivers with high forceps the prognosis for the child is not as good as if pituitary had not been given, and it is difficult to do a version. If one does a Cæsarian section after giving pituitary one may get a dead baby. If, then, there is some doubt about the head coming through with the pituitary do not give it.

In cases of retained placenta and postpartum hemorrhage Kinnear's experience has been good. The placenta usually soon becomes detached. For hemorrhage he usually uses ergot hypodermically, but where he has used pituitary it has quickly caused the uterus to contract and stopped the bleeding.

If a patient had a threatened or inevitable abortion would a hypodermic of pituitary have any effect on the uterus? Kinnear has not used it for this condition, but looking over the literature on this subject he finds that authorities differ on this point, some saying that it will convert a threatened into an inevitable abortion, others saying it has no effect on so early a pregnancy, as the uterus has not become sensitized to the effect of pituitary. Some uteri may become sensitized earlier than others, hence there may be some effect in one case and not in another.

In conclusion Kinnear says that in pituitary we have a very valuable extract that is of great benefit to the patient when properly used in properly selected cases. It is especially valuable to the country practitioner. It should, however, not be used in cases of contracted pelvis or in the first stage of labor, but only in the second stage, and if the child is not born within a few minutes one should deliver the patient with forceps before the effect of the pituitary has worn off, and thus prevent postpartum hemorrhage and also asphyxia or death of the child.

THE ABUSE OF PITUITARY EXTRACT.

In the *Journal of the Medical Society of New Jersey* for April, 1916, PRICE says he desires to urge upon the average practitioner the necessity for great caution in the use of pituitary extract. It would be wise for him to closely adhere to the following rules: Use the preparation of one reliable firm and stick to its use. Never give one Cc. for an initial dose; rather use one-third Cc. and repeat every half-hour. Do not administer it in primary inertia; it is better to give a dose of morphine and scopolamine, and after a refreshing sleep the pains will of themselves come on with renewed vigor. Always give pituitary extract before resorting to low forceps. Use it only in the second stage of labor and only when a distinct indication for its use exists. Finally, stick to the "terra firma" of established procedures; let those who have hospital protection do the fancy "stunts" and experimentations, and be not the "fool"—to enter "where angels fear to tread."

THE INDICATIONS FOR BLOOD TRANSFUSION.

KRIDA in the *Albany Medical Annals* for April, 1916, points out that the whole history of blood transfusion abounds in instances of fatalities following transfusion of incompatible bloods. Transfusion of animal bloods into humans retarded the development of transfusion for many years. Fatalities following the indiscriminate transfusion of human blood led three of the foremost surgeons of the last century—von Bergmann, Senn, and Gross—to condemn the whole procedure. Reports in the recent literature of accidents and deaths following transfusion are numerous enough, and represent probably only a small portion of the entire number of such occurrences. It is interesting to note that almost without exception these accidents occurred in cases in which no preliminary observations on the compatibility of the bloods for the proposed transfusion were made.

Ottenberg and Libman in a review of over 200 transfusions state: "In no case in

our series in which hemolysis or agglutination did not occur in the test-tube were any untoward symptoms observed which could be attributed to these phenomena. There were three cases in which agglutination of the donor's red blood cells by the patient's serum were observed in the test-tube. Two of these patients died shortly after the transfusion, and in the blood smears of both of them phagocytosis of the red blood cells by leucocytes was observed. . . . In the third case, the patient's serum was hemolytic to the donor's cells, and an extensive hemoglobinuria occurred after the transfusion, from which, nevertheless, the patient recovered." Lindemann in 135 cases reports one of hemolysis with negative laboratory findings, one case in which he had two conflicting reports from the laboratory, and one in which he transfused the patient a second time from the same donor, with five days intervening. He made no tests preliminary to the second transfusion, but subsequently there was test-tube hemolysis. In the light of Ottenberg and Thalheimer's research on agglutination in cats, this is easily explained. They show that cats frequently acquire an isohemolysin after transfusion against blood which was previously compatible. There were no deaths in Lindemann's series.

Experiment has shown that humans fall into four classes as regards the compatibility of their bloods, and that isohemolysins are inherited from either one or the other of the parents. Relatives therefore show less incompatibility than strangers, although it must be borne in mind that if, for instance, a sister is to be transfused with the brother's blood, either may contain isohemolysins from either of the parents. If the parents did not happen to belong to one of the four groups, the bloods of the children would be incompatible, according to Mendel's law, in 50 per cent of the cases.

This incompatibility may be readily determined by simple laboratory tests. Moss has shown that hemolysis is always preceded by agglutination, although agglutinin may be present without hemolysis. It has been shown that transfusion in cases in which the patient's serum agglutinates the donor's cells is dangerous. The converse of the proposition is not true to nearly the same extent, although it is questionable whether such blood can be considered of much value to the patient.

Peyton Rous and Turner have recently published a single method of testing for agglutination microscopically, which may be performed in a few minutes. Blood from the patient and prospective donors is obtained from a skin puncture, and collected in blood-counting pipettes which have been rinsed with 10-per-cent sodium citrate solution, and the solution drawn up to the mark 1. Mixtures of the patient's blood are made with that of the prospective donors in the proportion of 9:1, and 1:1. A drop of the mixture is placed on a slide, mixed with a drop of salt solution, and observed under the microscope. Agglutination is readily visible when it occurs, and is usually fully developed in two or three minutes.

Agglutination in the 9:1 mixture, with little or none in the 1:1 mixture, signifies that the patient's blood agglutinates the donor's corpuscles, and is unsatisfactory for transfusion. The converse may be determined by making a 1:9 mixture. Practically it will be found much easier to obtain the blood for these tests by venous punctures, as it readily clots in the pipettes.

To summarize, Krida concludes as follows:

Blood transfusion is indicated in—

1. Massive hemorrhage.

2. Marked secondary anemias, either as a palliative measure or as a preoperative measure.

3. Essential anemias.

4. Blood dyscrasias, if fresh human serum injections or thrombin are ineffective.

5. Chronic localized infections of demonstrable etiology not amenable to other treatment. Immunized blood should of course be used in these cases.

No blood transfusion should be undertaken without first making agglutination or hemolysis tests of the patient's and donor's blood.

THE TRUTH ABOUT SMALLPOX AND VACCINATION.

GAY in the *Boston Medical and Surgical Journal* of April 6, 1916, tells us that in these days there is no excuse for using impure vaccine virus. It is raised in young calves that have been carefully tested for those diseases to which they are liable. The process of vaccinating the animals is carried out with all possible antiseptic precautions. After the virus is collected they are immediately killed and examined for any diseased condition. If such is found, the virus is placed in cold storage for several weeks, during which time it is repeatedly examined and also tested upon guinea-pigs to ascertain its purity or efficiency.

For how long a period does a single successful vaccination protect an individual? It varies greatly in different persons. Many physicians and nurses who attend smallpox patients are protected by one "take." They usually repeat the operation occasionally as a precaution, but one "take," followed at once by another trial as a test, will protect a large number permanently. Yet, as a trial is the only sure test, it is well for all who have not been vaccinated within five years to repeat the operation on being exposed to smallpox. This is the most certain method of protection. As a rule, those persons who have had smallpox, or varioloid, do not need vaccination under any circumstances. There are very few deaths from smallpox among vaccinated persons, even when many years have elapsed since the operation. Complete protection, however, does wear out in a certain proportion of cases, hence it is safer to repeat the operation occasionally until it is demonstrated that the susceptibility has lapsed. The German method is reasonably efficient.

Primary vaccination should be done during the first year of life, as "cradle vaccination" causes comparatively little disturbance when properly performed. In adults the first vaccination with animal virus may cause considerable disturbance, but no permanent injury.

That diseases are not transmitted by vaccination in these days is evident from the fact that none exist in the animals from which the virus is taken. Furthermore, the affections alleged to be carried in that way, tuberculosis, tetanus, the social diseases, etc., are as common in the unvaccinated as in the vaccinated. Even in the old days previous to the almost universal use of animal vaccine, when the vaccination took place from arm to arm, it was the rarest of events for any affection to be conveyed in this way. Local infection in the shape of sore arms was common enough, as now, but systemic infection was almost unheard of. Careful investigation of the alleged serious results of vaccination usually showed that the trouble was due, not to the virus, but to the lack of care and skill in its performance and subsequent treatment.

It has been claimed that hygiene, isolation, and quarantine would control smallpox without resorting to vaccination. Experience proves conclusively that this disease is not controllable in this way. Without vaccination it is as prevalent among the hygienic as among the other sort—in fact, in the Niagara Falls epidemic, it was even more prevalent among the upper classes.

THE METABOLISM AND TREATMENT OF RHEUMATOID ARTHRITIS.

In the *American Journal of the Medical Sciences* for March, 1916, PEMBERTON reaches these conclusions:

1. The general conclusions already published as to the application of a restricted dietary in rheumatoid arthritis find confirmation within the limits indicated in the present series of 19 cases.

2. In cases rendered free, or nearly so, of acute symptoms by dietary means, exacerbations have been caused as an "experimentum crucis," by the ingestion of pure carbohydrate. Upon the withdrawal of this the symptoms have again subsided. The conclusion seems unavoidable that carbohydrate is a factor in the etiology and treatment of many cases of this disease.

3. Contemporaneously with natural or induced exacerbations of the disease there seems to be a tendency for the urine to

show a decreased acidity, as measured by the hydrogen ion concentration.

4. Observations on the carbon dioxide tension of the alveolar air in these cases show no great departure from the normal.

5. The non-protein nitrogen and urea of the circulating blood in uncomplicated cases of rheumatoid arthritis, examined both during ill health and convalescence, fall well within the normal range.

FEVER, THE INITIAL SIGN OF TUBERCULOUS INFECTION IN INFANTS.

REUBEN in the *Archives of Pediatrics* for March, 1916, says that everywhere one reads that tuberculosis of the mother is an absolute contraindication to nursing; this rule cannot be accepted *in toto*. Where nursing is of detriment to the mother it should never be advised, whether the mother is tuberculous or not. While Reuben does not underestimate the value of breast-feeding, he does not exaggerate the dangers of artificial feeding. It is not that he fears artificial feeding, but because he does not find it necessary under certain conditions for a tuberculous mother to wean her infant that he allows it in certain cases. Under these circumstances both the mother and the infant must be considered. If the mother has pulmonary tuberculosis, or tuberculosis of the breasts, the infant should be weaned at once. If the mother has latent, inactive tuberculosis and her physical condition is good he sees no reason for weaning. Tubercle bacilli are not excreted in the milk unless there is tuberculous involvement of the breasts; and as for the danger of infecting the infant, it is just as great if the infant be breast-fed or hand-fed by the mother.

Therefore, Reuben does not wean infants of tuberculous mothers under the conditions stated above, for if such infants become infected from their mothers (and in the majority of his cases he could trace the source of infection to some member of the immediate family), their chances of survival are far greater than they are when artificially fed. It would be ideal, if possible, in every case of a tuberculous mother to take her infant from her and bring it up under the most hygienic surroundings, away from the danger of tuberculous infection, certainly during the period in which tuberculous infection leads to tuberculous disease, and death in a majority of infants so infected. Reuben further concludes that:

1. The tuberculin reaction is a specific reaction. A positive reaction signifies the presence of a tuberculous focus, either active or latent, somewhere in the body. Normal individuals cannot be sensitized with tuberculin.

2. In infants tuberculous infection invariably leads to tuberculous disease, either mild or severe. The pathologic basis of tuberculous infection and tuberculous disease is the same in both—both terms imply the formation of tubercles. In the former the lesions are small, localized, and show signs of healing; in the latter the lesions are more extensive and more advanced. In adults tuberculous infection may take place without the occurrence of fever or any other signs; in infants tuberculous infection is invariably associated with fever and signs in the chest or abdomen.

3. All human beings are predisposed to tuberculous infection. Children of tuberculous parents are more apt to be tuberculous because they are more exposed to infection than are other children. Before they become infected, infants of tuberculous parents show the same physical development and the same gain in weight as do average children without tuberculous infection. The importance of segregating infants from tuberculous parents is apparent. Predisposition is easily overcome if exposure to source of infection is avoided.

4. Fever is the first sign of tuberculous infection in infants. The fever is of sudden onset; at first high (seven to fourteen days), is remittent, and gradually comes down by lysis, but not to normal; it continues at slightly above normal, 100°-101° for twelve to twenty weeks, with periods of complete absence of fever; exacerbations (two to three) of high fever, of same type as that of onset, usually occur.

5. The tuberculin reaction in these cases usually becomes positive at the onset of fever, or within a few days after the onset.

6. At the onset of the infection no physical signs are present. Within the course of a few weeks (two or three) they all develop signs in the chest, which, in cases which get well, gradually disappear.

7. The prognosis of tuberculous infection in infancy is more favorable than was formerly supposed; 30 to 35 per cent of these infants survive the infection.

8. From these facts Reuben is led to conclude that the pathologic lesions, even in infancy, may be localized and completely healed.

9. Fourteen per cent of prolonged febrile conditions in infants diagnosed as influenza give a positive Pirquet reaction. It is possible that many other fevers of obscure origin in infants, children, and adults are due to a reaction of the body to tuberculous infection.

10. The tuberculin reaction should be carried out on every infant who has an idiopathic fever and presents no physical signs.

FERMENTATIVE DIARRHEA IN INFANTS (CARBOHYDRATE FORM).

In the *Boston Medical and Surgical Journal* of April 6, 1916, HILL states that it is obvious that the one important principle in the treatment of a case of fermentative diarrhea due to carbohydrate is to give a food low in carbohydrate until the normal conditions are restored. If at the same time this food can contain a considerable amount of protein, in a form which is easily digestible, a great deal will have been gained, for in this way the reaction of the intestinal contents can be changed from acid to alkaline by the alkaline end-products of protein disintegration, and the source of the diarrhea removed. It is the high protein and relatively low carbohydrate percentage that has made the "Eiweiss" milk of Finkelstein and its various modifications valuable. The great drawback to these is their difficulty of preparation. The use of skim-milk dilutions, with the addition of powdered casein, meets the indication in treating fermental diarrhea, and such mixtures are infinitely more simple of preparation than any of the "Eiweiss" milk preparations.

During the past summer Hill has treated his cases of fermental diarrhea in this way. A soluble form of "calcium casein" was used, and found very satisfactory, the mixtures being very easy of preparation and the babies taking it very well. For babies under six months old a mixture of skim milk and water is used, with enough "calcium casein" added to bring the protein percentage up to 2.60 per cent—giving a formula: Fat, .25; sugar, 2.25; protein, 2.60. For babies over six months old the same dilution of casein is added to 3.00 per cent. One-third of an ounce of powdered casein in a mixture of 16 ounces of skim milk and water is used, but the powdered milk and 16 ounces of water raises the protein percentage to 2.60. In a 48-ounce mixture (24 ounces skim milk and 24 ounces water) 2/3 ounce of powdered casein raises the protein to 3.00 per cent. The amount given at each feeding depends of course on the individual baby, but in general slightly smaller amounts are given than would be given to a well baby of the same age and weight. The usual course of a case is that after a day or two of casein milk feeding the stools begin to diminish in number, become more yellow, and after three to five days become pasty, light yellowish-brown in color, and alkaline in reaction. After the diarrhea has stopped, whole milk is added to make the fat percentage from 1 to 2, and if this is borne well, in two or three days enough sugar is added to make the sugar percentage about 3.50. Malt sugar is the best to use, as it ferments less easily than do the other sugars. Sometimes the powdered casein is continued, sometimes not, depending on the case, but Hill has not fed any case on it for longer than 10 days. If the addition of the malt sugar causes no diarrhea, a gradual addition of sugar and a return to the normal feeding is made.

No drugs should be given to these cases. Drugs do the condition no good: it is simply a question of reëstablishing the acid-alkali balance of the intestine. Hill does not believe in an initial purge with castor oil: the irritating acids that have formed are quite enough of a cathartic, and it is adding insult to injury to irritate the intestine further. If there is a great deal of tenesmus and discomfort at defecation, and a great many stools, it is wise to give small doses of opium, but other than this no drugs are needed.

It would be tedious to give a number of case reports in detail, as most of the cases are very much the same, but a brief summary may be of interest. Thirty-five cases of fermental diarrhea were treated in the manner above described: all but two did well—one of these could not keep the high protein milk on the stomach; the other kept it down, but it did him no good. The remaining cases were most satisfactory. Most of the cases were babies under a year old, and it is surprising how they held their weight while being treated for diarrhea with the high protein milk; indeed, a good many actually gained. The average time of casein milk feeding was about five days; most cases began to improve in forty-eight hours.

On the whole Hill is convinced that when a high protein and a low carbohydrate milk is indicated, the best and simplest way of giving it is with skim milk and water dilution, made up to the required protein percentage by the addition of soluble "calcium casein."

TREATMENT OF PELLAGRA.

In the *New Orleans Medical and Surgical Journal* for March, 1916, Seccor points out that the obscure origin and cause of pellagra has necessarily made its treatment, to a great extent, symptomatic and empirical. In the *Journal of the American Medical Association* of May 8, 1915, an article appeared which reported the results that Dr. E. E. Palmer and the writer had obtained in the treatment of pellagra by autoserotherapy at the Kerrville Sanitarium. Since this report was made Seccor has treated a number of other cases, and always with the same excellent results.

They have recently received reports from various physicians who have used the autoserum treatment with success, not only in pellagra, but in other conditions where an increase in the antigenic function of the blood is desirable.

In their article in the *Journal of the American Medical Association* they did not make their technique as clear as they should have done. So they published in the *Medical Record* of July 17 a detailed description of their method, under the title of "An Improved and Simplified Technique for Autoserotherapy."

They mentioned in the above articles that tonic doses of arsenic hasten the improvement under autoserotherapy. Arsenic has marked action on the blood, producing a pronounced leucocytosis (Charteris, 1903). This condition of the blood serum produces a more potent exudate serum in the blister and gives more pronounced results.

In most of their cases they have found three drops of Fowler's solution after each meal amply sufficient. In a few cases, however, that did not respond readily to treatment, they have used ascending doses to ten drops after each meal.

They do not give arsenic continuously, but only for a few days at a time during the course of the treatment. In some cases with pronounced anemia they also use iron. For temporary relief of the burning in hands and feet, a strong solution of alum as a wash is quite effectual, and, for the sore mouth, liquor antisepticus as a cleansing agent is very pleasing.

In the cases with marked nervous and mental symptoms they use bromides for a few days until the serum treatment begins to show its effect, and in some cases it is necessary to continue their use at intervals for several weeks. It is on these nervous and mental symptoms, however, that the autoserum first shows its good effect.

In most of their cases 1 Cc. of the autoserum at intervals of one week proved perfectly satisfactory; in a few obstinate cases,

however, larger doses and shorter intervals were used with benefit in all but two cases, in which the symptoms were aggravated, and the dosage was immediately dropped to 1 Cc. While many of their first cases were cured by autoserotherapy without paying any attention to diet, they now make it a rule to see that patients get a well-balanced ration, free from canned goods.

It is possible that the very rapid results they have obtained in most of their cases have been partially due to change of climate, for nearly all of their cases were imported, coming from lower altitudes. The climate change, like arsenic, improves the blood, and this aids in the production of a more potent exudate serum.

They have had ample evidence that climate, diet, or arsenic taken alone will not produce cures in any considerable number of cases. Furthermore, they have seen patients, who were either at a standstill or on the retrograde after prolonged treatment by sodium cacodylate, picric acid, and diet, begin to improve promptly when placed on the autoserum treatment.

THE CHEMISTRY OF COW'S MILK AND OTHER PRODUCTS USED IN INFANT FEEDING.

In the *Archives of Pediatrics* for January, 1916, HOWE reminds us that in the nutrition of the infant we cannot get away from the fundamental facts that fats, carbohydrates, proteins and salts are the essential constituents, and any proprietary food laying claim to being a complete food for an infant must contain all of these in forms which can be readily assimilated and in properly balanced proportions. We all know how difficult it is to keep fats in a sweet and wholesome condition for any length of time, and while it is not difficult to keep the proteins, still it is no easy matter. This narrows the field very considerably when it comes to making a proprietary food, and as a natural result we find most of them are made of blended carbohydrates in a large measure, milk-sugar or maltose, dextrins, and the various starches, all of which can be used at less cost under their respective names and used as desired without the handicap of a blended product which is made to meet conditions in general and no one condition in particular. They have been admirably treated in Holt's book, and Howe includes Holt's analyses in this paper for the purpose of collecting all this data under one heading:

HOLT'S BOOK.

The Composition of Infant Foods.

	Nestle's Food.	Mellin's Food.	Malted Milk.	Ridge's Food.	Imperial Granum.	Lactopreparata.	Carnick's Soluble Food
Fat	5.48	0.31	2.66	1.11	1.04	12.35	7 54
Proteids	11.04	10.70	15.18	11.93	14.13	14.51	10.25
Dextrins	7.38	40.96	31.97	1.23	1.38		
Dextrose and maltose		37.38	31.79	0.52	0.42		
Cane sugar	30.59	4.23	4.15	1.16	trace		
Milk sugar	7.60					63.68	
Total soluble carbohydrates	45 57	82.57	67 91	2 91	1 80	63.68	27.08
Insoluble carbohyd. (starch)	29.95			77.96	76.11		37.45
Inorganic salts	1.72	3 20	3.34	0.49	0 39	3 66	4.42
Moisture	1.50	4.09	2.20	8.58	8.38	5.80	3 42

THE MANAGEMENT OF SUMMER DIARRHEA.

A. D. SMITH contributes to the *Archives of Pediatrics* for May, 1916, a long article on this topic. He states that the general principles of treatment are the same for all cases, and so distinct that there is no mistaking them. In applying them we are to remember that we are dealing with an intoxication arising from the intestinal contents, and that an inflammatory condition of the stomach or intestines may or may not be present. These principles are:

1. The thorough emptying of the stomach and intestines.

2. Rest in bed and rest to the stomach and intestines.

3. Supplying of fluid to compensate for the great drain.

4. Elimination of toxins.

5. Measures to allay the inflammation.

To these general principles must be added:

6. The treatment of special symptoms.

The Thorough Emptying of the Stomach and Intestines.—Vomiting sometimes empties the stomach completely. If any doubt exists the stomach should be washed out. Persistent vomiting is usually controlled by

washing with the fluid at 110°. In the severe cases of cholera infantum the stomach is always to be washed out. When the fever is high 1 or 2 ounces of water may be left in the stomach. Lime-water may be introduced with benefit if the stomach contents are very sour. In children over two years of age stomach washing cannot be employed without undue struggling, the very thing we wish to avoid. As a substitute for stomach washing, boiled warm water may be given freely. It is usually vomited promptly and may cleanse the stomach.

For emptying the small intestine cathartics alone are available. Calomel will usually suffice in the mild cases. It is a mild intestinal antiseptic and increases the flow of bile. Up to one year 1/10 grain is given every half-hour for ten doses; between two and three years ⅛ grain every half-hour for ten doses; from three to six years 1/6 grain every half-hour for ten doses.

Castor oil should follow the calomel in all severe cases. It can be given one-half hour after last dose of calomel. Up to one year, 1 drachm; one to three years, 2 drachms; three to six years, ½ ounce. It is frequently vomited, but is so adhesive that it usually will not all be vomited. It should be repeated three times if vomited. It sweeps the whole intestinal canal, is very certain, and its after-effects are soothing.

Saline cathartics are useful if the movements are small in amount and we desire to aid in elimination. They should not be used when the patient is greatly depressed, with sunken fontanelle, low temperature, and evidences of great need of water. Milk of magnesia is prompt and antacid, but is mild and not to be relied on in serious conditions. Sodium sulphate is better borne by the stomach than any of the other salines except milk of magnesia. It is best given in repeated small doses—10 grains in 1 drachm of water to a child of one year.

Colon irrigation should be used in all severe cases to supplement the action of cathartics. It should be done by the physician himself or by a competent nurse two or three times during the first day. Afterward once daily is usually enough. The best solution is normal saline, one tablespoonful of salt to two quarts of water. The bag of the fountain syringe is held about two feet above the child. After expelling the air and filling the catheter, No. 15 American scale, with saline, the catheter is inserted just within the sphincter and the water turned on. As it flows the catheter is gradually pushed upward to a distance of ten or twelve inches. The water distending the intestine in advance of the catheter makes its introduction easy, and prevents the catheter curling on itself in the majority of cases. The washing should be continued until the solution returns quite clear. Gentle kneading of the abdomen should be continued during the early part of the irrigation to facilitate the passage of the water into the upper part of the colon. When the temperature is low, with symptoms of collapse, the normal salt saline should be at a temperature of 110°. If the temperature is high, it can be reduced by using the solution at a temperature of 80° F.

Rest in Bed and Rest to the Stomach and Intestines.—Rest to the stomach and intestines is a *sine qua non* of the treatment. Emphasis should be placed on keeping these patients quiet in bed. Even if the child is able to walk it should not be allowed to do so.

Rest for the stomach and intestines is accomplished by withdrawing all food for from eight to twenty-four hours. The withdrawal of food should be complete. In all severe cases digestion is practically at a standstill, and food given at this time will only increase the difficulties of the position. Boiled water is to be given cool and in small amounts at frequent intervals.

Supplying of Fluid to Compensate for the Great Drain.—In the mild cases this can be accomplished by giving cool boiled water frequently. In the more severe cases the colon will absorb a considerable quantity of fluid if, after the intitial thorough cleansing, the irrigation with normal saline is continued, allowing the water to

flow in and return slowly, and using as much as 1 or 2 gallons. In the severe cases and those of the cholera infantum type, the only efficient method of supplying the great amount of fluid lost is by hypodermoclysis. At least half a pint should be given in the course of twelve hours, and sometimes more is better. The injection is given into the cellular tissue of the abdomen or buttocks slowly.

Elimination of the Toxins.—Elimination is assisted by the fluids supplied. The colon irrigations assist in the elimination from the bowels, the kidneys, and the skin. Occasionally salines are useful to assist elimination from the bowels. Bathing is useful to assist elimination from the skin.

Measures to Allay the Inflammation.—Rest to the stomach and intestines is important. After the digestive tract has been thoroughly cleaned out and the toxemia lessened, the inflamed intestinal mucous membrane should be covered with bismuth. To accomplish this bismuth subnitrate must be given in large doses, at least 1 or 2 drachms to a child of one year. It is insoluble in water, and is best given suspended in mucilage of acacia. It usually blackens the stools.

Intestinal antiseptics are useful even if they do not render the whole intestinal tract antiseptic. Certainly it is reasonable to believe that they inhibit bacterial growth, and experience leaves no doubt that they are beneficial. Salol is the best, as it leaves the stomach unchanged, and is decomposed in the intestines into carbolic and salicylic acids. It has the disadvantage of causing vomiting sometimes. It should be given in doses of 1 or 2 grains every two hours to a child of two years. Bismuth is also antiseptic, though this action is secondary to its protective influence on the mucous membrane.

Astringents are indicated only in catarrhal diarrhea which follows the acute symptoms. Tannalbin is the most useful. It is insoluble in the stomach, but is slowly decomposed in the intestines. It therefore causes no gastric disturbances, but is gently, yet firmly, astringent on the entire intestinal mucous membrane. Patients under one year are given 15 to 30 grains in the twenty-four hours. Sometimes it can be used with opium. It is insoluble in water, and should therefore be given in gruel or suspended in mucilage.

Opium is used much too frequently and often at the wrong time. Its indications are a continuance of the frequent movements and severe pain. It is contraindicated until the stomach and intestines have been thoroughly cleaned out, when the number of discharges is small, and especially if they are offensive, and when cerebral symptoms with high temperature are present with scanty discharges. It finds its best use during convalescence, when the taking of food is followed by a movement of the bowels. To a child of one year 5 minims of paregoric may be given, always in a separate prescription, to be repeated until the desired effect is obtained. In cases of the cholera infantum type, with large fluid movements and symptoms of collapse, morphine should be given hypodermically, 1/100 grain to a child one year of age, remembering always the contraindications.

The Treatment of Special Symptoms.—Acid fermentation in the stomach, manifested by vomiting of sour material and eructation of gas, is best met by the alkalies, lime-water, bicarbonate of soda, or chalk mixture. Either of the first two may be added to the water and used for washing out the stomach when indicated.

Prostration is present in the majority of cases. It is best relieved by whisky, diluted with at least eight parts of water. It can frequently be added to the water given to allay the thirst. Half an ounce of whisky to a child one year old is the maximum amount as a rule. If needed, tincture of strophanthus, 1 or 2 minims every four hours, may be added to the whisky. [We question the value of strophanthus.—Ed.] If stimulants given by the mouth are vomited and the case is a severe one, they are to be given hypodermically. Whisky, ether, and camphor in oil (1-in-10 solution) may be used. Strychnine is not to be used when

the nervous symptoms are those of irritability with a tendency to convulsions. The dose is 1/300 grain to a child one year old. In cases of the cholera infantum type morphine 1/100 grain with atropine 1/1200 grain hypodermically, is sometimes life-saving. In connection with these cases hypodermoclysis finds its most certain indication.

OBSERVATIONS ON 100 CASES OF THE INFANTILE TYPE OF HEREDITARY SYPHILIS.

In the *American Journal of Diseases of Children* for March, 1916, VEEDER and JEANS state that they have attempted to carry out various methods of treatment and combinations of drugs in a comparative way, being governed to a large extent in methods by the case as an individual problem. In some cases in their series the duration of the treatment was too short to be of any value in forming an opinion as to the efficacy of the method, and in 11 cases no treatment was instituted for various reasons. They have been able, however, to accumulate sufficient data in 73 cases, in 41 of which neosalvarsan was used in combination with mercury, and in 31 some form, or forms, of mercury alone was given. As experience has shown that neosalvarsan alone is not as efficacious as when combined with mercury, but one infant was treated in this way. They do not use iodides in the treatment of hereditary lues. In the light of the specific action of mercury and arsenic on the comparatively recently-discovered etiologic spirochete of syphilis, it is hardly a rational procedure, and, moreover, it is a drug not easily borne by the infant. The various combinations and the number of cases in which each was used are shown in the following table:

Form of Treatment and Number of Cases.		
Neosalvarsan 1		
Neosalvarsan with gray powder.....21		42
Neosalvarsan with inunction..... 8		
Neosalvarsan, gray powder and inunction.12		
Inunctions 13		
Inunctions and gray powder 7		31
Gray powder 11		

The neosalvarsan injections were all given intravenously by means of a glass syringe into the median or external jugular vein, as a rule. The dosage used was 0.075 to 0.15 gm., according to the size of the infant. No bad results were experienced following the injections. The 42 infants receiving neosalvarsan were injected as follows:

21 cases received 1 injection.
12 cases received 2 injections.
7 cases received 3 injections.
2 cases received 4 injections.

The deaths were divided proportionately between the cases receiving mercury alone and mercury in combination with salvarsan. For the reasons discussed, the mortality is of little service as an index of the value of specific treatment in these cases, and they can only form an opinion by considering the effects of treatment of the symptoms.

Neosalvarsan causes a rapid disappearance of the syphilitic lesions, especially of the cutaneous symptoms and the rhinitis. It is more rapid in its effect than inunctions of mercury, and much more so than gray powder used alone. Intramuscular injections of mercury are not suitable for use in infants or in children. It is a simple procedure to inject neosalvarsan intravenously, and they use it freely in the out-patient dispensary without admitting cases to the hospital. The only precaution to be taken is that it must be injected directly into the vein without any of the solution escaping into the perivascular tissues. This requires some degree of skill and practice for small veins; and hence the external jugular is easier for routine work.

In a number of cases the use of neosalvarsan has caused such a rapid disappearance of the rash and rhinitis that it has been difficult to persuade the parents that the condition was not trivial and that the child required further treatment. The hardest problem as regards the medicinal treatment of hereditary syphilis consists in persuading the parents to persevere in treatment after the active signs of the infection have disappeared. On the other hand, inunctions are unpleasant and very much objected to by the infant's caretaker as a rule. Nevertheless the treatment should be

started by one of these two intensive methods of combating the infection. They find it most satisfactory soon to discontinue the one used and change to gray powder, which is the most useful form of mercury they have found for treatment over long periods of time, as it causes as a rule the least disturbance of digestion. If started early, before all active signs have disappeared under the more intensive inunctions or salvarsan therapy, it is more apt to be continued for a longer period of time. The ideal method for practical purposes, and the method which gives best results, in their experience, is two injections of neosalvarsan with a three-day interval followed by a series of courses of gray powder (gr. 1.5 t. i. d.) of a month or six weeks' duration, with an interval of from ten days to two weeks between courses. These should be continued well into the second year of life, or until the Wassermann has been made persistently negative, if the case can be kept under control for such a length of time. If neosalvarsan is not available, a course of inunctions of mercury (gr. 10 to 15 daily), lasting two weeks, may be substituted.

It is at times surprising to find how the Wassermann persists after seemingly intensive treatment in many cases. They are trying to ascertain how many of these infantile cases in which the extent of the treatment is known develop "late" lesions in childhood, as they know of no studies in regard to this point, but the nature of the material at their disposal makes such a study difficult. A careful control of the diet and of the general hygiene is as essential as the specific therapy as far as the immediate treatment of the case is concerned.

In a previous paper they made the statement that they had been unable to obtain a persistently negative Wassermann in a child with "late" hereditary syphilis, despite the most intensive treatment. Although some of the cases reported at that time have been under treatment for a year and a half since, they have no cases as yet which lead them to modify this statement. This, however, does not hold true for the infantile type, as in a number of the cases in this series the Wassermann has become negative as the result of the treatment outlined above and has remained so for many months, nor have these cases developed any further symptoms of lesions of a syphilitic nature. In other words, it seems probable that some cases have been cured, if, as is held at present, a persistently negative Wassermann constitutes a proof of cure. In the majority of cases, however, it would seem as if the condition had only become latent or quiescent as the result of treatment, and only the subsequent course of the case can determine whether this treatment—which has caused the disappearance of all clinical manifestations, but which has not affected the Wassermann—has been sufficient. From their knowledge of the early treatment of many children with late lesions they are not very optimistic in regard to this group of infants. Cases of apparent clinical similarity respond differently to the same kind and amount of treatment. In some of their cases the Wassermann has become negative, while in others treated in the same way it has remained positive. No general rules, therefore, can be deduced from their cases in regard to the length of time treatment is necessary for the production of a negative Wassermann. Each case in this respect must be treated individually, and they can only say that if the development of late lesions is to be inhibited, it is apparently necessary to continue the treatment of an infant with syphilis until the Wassermann has become negative and remained so after an interval of freedom from specific medication.

AMMONIA AS AN ENEMA.

In the *Lancet* of February 12, 1916, BLACK writes as follows:

"May I draw your readers' attention to the effectiveness of an ammonia enema in the treatment of postoperative ileus and intestinal paresis? This sequela of an abdominal operation all have found to be most distressing to the patient, while it is exasperating to the surgeon, and in extreme cases even dangerous to the patient's life.

I understand that at the front it has proved frequently a fatal complication of operations for abdominal wounds.

"The prescription is liq. ammon. fort. 1 dr., water one pint, administered as an enema; its effect is greatly enhanced by a hypodermic of pituitary extract 1 Cc. half an hour previously. This treatment is sure to result in a good motion and discharge of excessive flatus, and again and again I have found it to act where the ordinary enemata, turpentine, eserine, etc., had failed. Two words of warning I would give—namely, that if used frequently, or if used in greater strength than I suggest, injury to the rectal mucous membrane is liable to take place. On two occasions the daily administration of the enema for three consecutive days resulted in a certain amount of rectal hemorrhage. On another occasion the mistake of a nurse in putting in too much ammonia gave the patient a very painful septic colitis lasting for a week.

"My excuse in writing about this is that although I do not claim originality, I have not been able to find in any text-book any mention of ammonia used as an enema, nor have I ever met any one in England who ever heard of it. Yet I am convinced of its importance."

PITUITRIN: ITS USES AND LIMITATIONS IN OBSTETRICAL PRACTICE.

JONES in the *Virginia Medical Semi-Monthly* of February 25, 1916, states that he used his first dose of the preparation a little over eighteen months ago. Since that time he has had 58 obstetrical cases and used pituitrin in 14 of them—four primiparæ and ten multiparæ. He has tried to be very careful in the selection of his cases. He has never used it before dilatation was almost if not quite complete, until he assured himself that the position was such as not to materially interfere with delivery; until he felt reasonably sure there was no special abnormal resistance in the soft parts or in the bony pelvis; nor has he ever used it until the pains had become inefficient and the progress of labor markedly retarded or entirely arrested. He has never given more than one Cc., nor has he ever repeated the dose.

In two of the primiparæ the result was good, though not nearly so pronounced as in some others. The pains were stimulated very much almost immediately, and one case was delivered in about 35 minutes, and the other in about 45 minutes, after giving the pituitrin. In the other two cases he was much disappointed. In one there was just one strong pain in from three to five minutes after giving the medicine, and then all pain ceased and he delivered a little later with forceps. In the other, pains were temporarily stimulated but soon grew weaker, and he resorted to instruments again.

But what of the ten multiparæ? Some doubt may be cast upon the statement, but Jones gives his word that in each case in less than twenty minutes—and sometimes much less—a crying baby was born. The pains came on almost immediately—certainly in not over three to five minutes—and kept up good and strong as long as pains were needed. One objection, as he sees it, is that at times they come with almost no interval between them. Now, considering the fact that in every case there was marked uterine inertia with no prospect of an early termination of labor, he regards the effects as very remarkable. He has given chloroform in perhaps one-third of the cases after giving pituitrin, but, strange as it may appear, the patient seems to be so taken up with the changed condition of affairs and the progress of labor that she rarely says much or complains of the pains being unbearable. By way of illustration, he gives something of the experience with his first patient of the kind, a multipara. After waiting a good long time on a tedious labor and a tired patient, with many misgivings and forebodings he decided to give pituitrin. The result was, of course, as above mentioned. Early in the calm that followed the awful storm the patient innocently said, "For the Lord's sake, doctor, what-fur stuff was that you put in my arm?" He gave an evasive

answer and asked why she wanted to know. She said, "Well, I don't know much about it, but it 'peared to me it must a bin dynimite." So, when we use pituitrin in this class of cases we had better have things in readiness for an immediate reception. We as children used to say, when the nose itched, "somebody's coming." The itching nose sometimes failed to bring the visitor; but pituitrin, never!

It may naturally be asked if all these cases would have been instrumental ones, and if they could not have been delivered just as readily with forceps as by the use of pituitrin. Some of them, he is quite sure—and he thinks at least one-half of them—would have been delivered with forceps, and with proper help this could have been done quite easily. To be sure, some city practitioners may prefer this line of procedure, but when we "country devils," to use Dr. Fisher's designation, have to act as operator, assistant, anesthetizer, nurse, and "granny," Jones prefers pituitrin. And, besides, with pituitrin one can get through before one can get his forceps boiled.

In none of the 14 cases was there a laceration of the perineum, or a postpartum hemorrhage. In one case, however, he encountered extreme difficulty in delivering the placenta. Whether or not the pituitrin was in any way responsible for this trouble he does not know, but he is inclined to think it was. He has used pituitrin in one case of postpartum hemorrhage (though it had not been used during labor) with very prompt and satisfactory results—more prompt and pronounced than he has ever gotten from ergot or ergotole. Why the effect is so much less satisfactory with primiparæ he does not know, but in his experience such has certainly been the case.

Jones thinks he has indicated, in a general way, what he would consider some of the most important contraindications. He finds it is often used in the first stage of labor, but from what he knows of its action he would not expect very satisfactory results until dilatation is well under way. What pituitrin does, it does so quickly and with such tremendous force he would feel that there was too much resistance to be overcome when used early, and his experience has been that better and stronger pains are produced when used later. He has never used it in abortion or premature labor, but does not see why it should not do well when the pains lack force. It seems to him that its field of usefulness in obstetrical work is rather a restricted but at the same time a very important one. When indicated, he is quite sure we have nothing in the way of an oxytocic that can be compared with it. The fact is, in properly selected cases he gives it with as much confidence as he gives a hypodermic of morphine for the relief of pain in renal or hepatic colic.

SERUM TREATMENT OF BACILLARY DYSENTERY.

The *British Medical Journal* of January 22, 1916, in an editorial article points out that as long ago as 1907 Kruse and Shiga independently proposed the use of serum made from the bacilli known by their names for the treatment of dysentery, and good results were said to have been obtained. In later years, however, so many other species of bacilli have been found to produce symptoms of bacillary dysentery that it has become necessary, in the absence of definite bacteriological research, to use serums called polyvalent made from several varieties of such germs. In 1910 Ruffer and Willmore prepared such a polyvalent serum, the constituents being the following bacilli: (1) Shiga-Kruse No. 1; (2) El Tor No. 1; (3) pseudo D. (Kruse); (4) Flexner, including pseudo A. (Kruse); and (5) some as yet unidentified strains. At the same time a monovalent serum against the Bacillus dysenteriæ El Tor No. 1 was made also. In using these serums for treatment the general practice of the authors was to give an initial dose of 40 to 60 Cc. in mild cases, of 80 Cc. in severe cases, and of 100 to 120 Cc. in desperate cases. These doses were repeated as required, as much as 320 Cc. being given in twenty-four hours.

The injections appeared to have a bene-

ficial effect, manifested in from four to twelve hours after the first injection. In all cases the most striking phenomenon was the improvement in the patient's general condition; the pulse became fuller and slower, the heart sounds of better quality, the temperature fell to within normal limits, and abdominal pain disappeared. A remarkable effect upon the patient's mental condition was observed also. These striking changes in the general condition were not usually accompanied by a corresponding improvement in the character of the stools, which often became more abundant and fetid and contained more sloughs; the number passed, however, was usually diminished.

In 1913 Willmore and Savage gave a short account of the treatment of 227 cases in which the presence of bacillary infection was demonstrated. In this series it was often noted that the patient exhibited marked improvement for a few hours following the injections, only to relapse again when presumably the effects had worn off. In such cases the injections had to be repeated until the improvement became permanent. Between November, 1912, and January, 1913, the number of pilgrims that passed through the quarantine station at El Tor was 16,551. Of these 75 were admitted into hospital with dysentery and nine died. Out of 26 cases in which bacillary dysentery was present, 22 were treated with serums, with two deaths, a mortality of 9 per cent. The percentage of deaths among pilgrims in Egypt attacked by dysentery has been reduced since the introduction of serums from 53, and even from 70, to 12.

Similar satisfactory results have apparently been obtained in Japan and Fiji, as well as in France, Russia, and Germany. The notes on the treatment of diarrhea and dysentery issued by the Advisory Committee for the Prevention of Epidemic Diseases in the Mediterranean Force say of the serum available for the force that there is no doubt that in many cases it is of great value, and that the earlier it is given the better; a dose of 20 Cc. administered by subcutaneous injection is, as a rule, sufficient, but, if deemed necessary, as much as 60 Cc. may be given at the outset, or the smaller initial dose may be repeated. Shiga is responsible for the statement that since the introduction of antidysenteric serum the case mortality from bacillary dysentery has fallen from 35 to 9 per cent. Many serums are now to be obtained, including those of Kruse, of Shiga, of the Lister Institute (Todd), and of the Pasteur Institute (Vaillart and Dopter). Shiga's rules for the administration of his polyvalent serum are: In mild cases to inject one dose of 10 Cc.; in cases of medium severity to inject two doses of 10 Cc. at intervals of six hours; in severe cases to inject 10 Cc. twice a day, at intervals of six hours, for two or three consecutive days. Castellani and Chalmers state that a polyvalent serum, such as that of Shiga, is to be preferred for the treatment of cases in which a complete etiological diagnosis of the malady cannot be made. The serum, in their experience, should be given in large doses—that from the Pasteur and Lister Institutes in 20 Cc. doses twice daily, and in very severe cases four times daily. The injection can be made intravenously or under the skin of the abdomen or flank, using ordinary aseptic precautions. Such injections, they believe, as a rule need not be continued after the second or third day. In some instances the injections cause a slight rise of temperature or even urticaria-like eruptions and pains in the joints. According to their experience the serum has a marked effect upon the disease, hastening the cure, ameliorating the symptoms, and reducing the mortality.

Other observers have not perhaps met with such good results, and it is a fact that there are cases in which the serum appears to fail. The cause of these failures may quite well be that the individual case of the disease is due to some species or strain of bacillus not contained in the serum that has been used. This is a possibility which must not be lost sight of.

Again, it is quite possible that in the past amebic cases may have been so treated, as

well as cases of diarrhea and bowel troubles not necessarily connected with dysentery, and the Mediterranean "notes" from which we have already quoted say that "in cases of doubtful etiology there should be no hesitation in employing a combined therapy of emetine and polyvalent serum." The diagnosis of the various forms of dysentery is not easy, and until this has been put on a more scientific basis much confusion must necessarily exist as to the treatment most suitable for each individual type. On the whole, however, the bulk of the evidence is in favor of the use of serums in bacillary dysentery. It is important that records should be carefully kept of all cases so treated, as the statistics so obtained will be of the greatest use in the future.

SALVARSAN INTRAVENOUSLY AND WITH AUTOSALVARSANIZED SERUM INTRASPINOUSLY IN TREATMENT OF SYPHILIS OF THE CENTRAL NERVOUS SYSTEM.

DEXTER in writing in the *Cleveland Medical Journal* for January, 1916, reaches these conclusions:

1. There are undoubtedly cases in which an arrest of the process may be accomplished by the use of mercury alone. On the other hand, there are a very definite number of cases of syphilis of the central nervous system in which the action of mercury is positively detrimental. In these cases salvarsan acts extremely well and is an invaluable addition to our armamentarium.

2. There are many instances in which the process may be arrested by the intravenous injection of salvarsan alone. These are usually meningovascular involvements, and the best results are to be expected in the early cases, especially those which have begun to have symptoms, but in which the physical signs of the disease are either absent or slight. Whether the abolition of all the serological signs of the disease can be expected under the intravenous administration of salvarsan is, as far as Dexter's experience goes, still open to doubt.

3. When mercury given intramuscularly and the intravenous injections of salvarsan have failed to arrest the process satisfactorily, the intraspinal administration of autosalvarsanized serum will have a markedly beneficial effect in a large proportion of cases.

4. The form of affection most amenable to treatment is that with meningovascular involvement. The greater the central degeneration the less can be expected from treatment, for there is no drug which can reëstablish nerve tissue once it has been destroyed. As it is often difficult to differentiate clinically between these types of the infection, active and intensive treatment should be tried in most cases. However, it is probable that very little can be done in most cases of general paresis.

5. The Swift-Ellis method for the intraspinal administration of autosalvarsanized serum, when carefully administered and rigidly adhered to, is a safe and eminently proper procedure for the combating of syphilis of the central nervous system.

THE ROLE OF FAT IN INFANT FEEDING.

MORSE in the *Archives of Pediatrics* for January, 1916, states that little is known as to the significance of fatty acids and soaps. Fatty acids are irritating to the intestines, soaps are not. A loose, acid stool can often be changed to a "soap stool" by a relative increase in the amount of casein in the food, while an alkaline soap stool can be changed to an acid stool by a relative increase in the amount of carbohydrates. That is to say, whether the fat is in the form of fatty acids or soap depends chiefly on the reaction of the stool, which in turn depends on the relation of the food components to each other. The intestinal flora also changes with the change in the reaction. The absorption of fat in babies that are passing soap stools is less than when the stools are normal. (This raises the question as to why so many pediatricians are so anxious to get "soap stools.")

Increased peristalsis with consequent

diarrhea results in an increased loss of fat in the stools. It makes no difference what is the cause of the diarrhea, whether it be an excess of fatty acids, an excess of carbohydrates, or some parenteral infection.

The relation between the amount of fat in the food and the absorption of such salts as combine with fat would seem at first glance to be a very simple one. Such is not, however, the case. It seems probable that when there is a large amount of soap the absorption of calcium and magnesium is diminished. It would seem reasonable *a priori*, moreover, to suppose that when the fat in the food is increased beyond a certain point, there would be an increasing loss of mineral salts. This is apparently not the case, however, unless there is a fat diarrhea, because the data from metabolism experiments show that in the normal infant a high fat intake does not change the mineral composition of the stools. In chronic malnutrition, however, the output of salts in the feces is considerably raised by increasing the fat in the food.

NEEDLESS SURGICAL OPERATIONS FROM FAILURE TO RECOGNIZE TABES DORSALIS.

The *Journal of the American Medical Association* of February 12, 1916, contains an article in which NUZUM reaches these conclusions:

1. Of 1000 tabetics, 8.7 per cent have been subjected to laparotomy under mistaken diagnosis one or more times.

2. The "crises" of tabes have largely influenced the surgeon in his decision to operate. This statement is supported by the fact that 65 per cent of the eighty-seven patients operated on presented visceral crises. In 17 per cent of these the "crises" were the initial symptoms of their disease.

3. Mistaken diagnoses and resulting operations occur chiefly through failure to examine the nervous system.

4. Gastric ulcer, gall-bladder disease, and appendicitis are the diagnoses most frequently made.

5. Tabetics subjected to several successive laparotomies have, as a rule, been operated on by as many different surgeons.

6. A history of paroxysmal attacks of vomiting, rheumatism, paresthesias, bladder disturbances, or fractures without physical violence should excite interest to exclude tabes dorsalis.

7. The cytodiagnosis of the cerebrospinal fluid, together with the Wassermann reaction with the spinal fluid, is of inestimable value in doubtful cases.

THE ROLE OF SALT IN INFANT FEEDING.

In the *Archives of Pediatrics* for January, 1916, BARTLETT points out that the individual salts of cow's milk are present in larger quantities than the corresponding salts of woman's milk with the exception of iron—1000 grammes of woman's milk contains from 1 to 4 mg. of the oxide of iron; 1000 grammes of cow's milk contains 0.4 to 0.7 mg. After cow's milk is diluted the iron content in the resulting dilution is reduced to a negligible quantity. It is necessary for the child's nutrition to make up this iron deficit when the child is fed on cow's milk. The anemia which often accompanies prolonged milk feeding is familiar to every one. At least one explanation of this is found in the lower iron content of milk formulæ. It is desirable to make up this loss in iron. There are two ways to accomplish this: by administering iron directly or supplying the iron by adding to the diet articles of food containing iron. The latter is the more rational way to meet this contingency. Before the more accurate methods of infant feeding became established, food from the table was fed to infants. This practice has not been entirely abandoned. Perhaps there is some practical wisdom in this careless mode of infant feeding which scientific methods have failed to recognize.

It is Bartlett's belief that the nutrition of many children has suffered from the failure to supply early enough an adequate quantity of iron, as well as other salts, to the growing infant. The age at which this

deficit in iron manifests itself is after the sixth or seventh month. This period corresponds with the eruption of the teeth. After six or seven months the loss in iron may be made up by giving other foods besides milk. If these foods are given in small quantities at first, and gradually increased, the adaptation to the articles of diet may be accomplished without harm to the infant. Some of the foods which may supply the iron, as well as other salts, are yolk of egg, cereals, green vegetables, and cooked fruit. Properly cooked and properly fed, Bartlett believes these foods may be given without damage to the digestion.

Bery has shown that green vegetables furnish calcium in one of the best forms for absorption, and that if properly administered they serve a valuable function in the mineral nutrition of the child. This is especially true of spinach. Besides furnishing iron to the growing organism, the feeding of green vegetables also especially favors calcium retention. It has been Bartlett's practice for some time to feed eggs and green vegetables to healthy children under a year, and he believes that it has resulted in producing more vigorous infants. Their fontanels have closed earlier, they have walked earlier, and they have been more active. In a word, they have seemed to be stronger, healthier infants than those who have been fed milk almost exclusively during the first year. He believes that this improvement in nutrition is in part due to the increased salt retention, especially as it is related to iron and calcium.

VENESECTION AS A THERAPEUTIC MEASURE.

In the *Boston Medical and Surgical Journal* of February 24, 1916, LAWRENCE after discussing this subject says, in conclusion, that the following statements seem justified by the cases he reports and others:

1. Venesection, performed under proper indications, is not a dangerous measure, especially since the "dose" can be accurately controlled.

2. In the presence of dilatation of the heart, renal toxemia, hypertension, or a combination of these conditions, it may be expected to act more promptly and more surely than drugs.

3. It lowers blood-pressure and at the same time produces a more efficient circulation when performed in cases of hypertension, but does not, in therapeutic "doses," lower normal arterial tension.

4. It should never be performed in the absence of definite indications, but should not be withheld until the hope of success for any measure is gone.

5. The amount of blood to be withdrawn is to be decided by the point at which relief is obtained. The error is generally on the side of too small an amount.

6. Repeated bloodletting, when indicated, does not seem to have any ill effects upon the composition of the blood.

THERAPEUTIC APPLICATIONS FOR THE LOCAL TREATMENT OF DISEASES OF THE EAR, NOSE AND THROAT.

In the *Indianapolis Medical Journal* of February 15, 1916, COBLE in speaking of the various remedies he has found useful proceeds to name these drugs and some of their mixtures. To one doing special work in this line many additions would have to be made to complete a satisfactory list; in fact, one would nearly have to compile his own list, in order to bring it up to his own views and requirements.

Cocaine hydrochloride is a most useful and valuable drug, but one that must be used with great caution. Many patients object to its use, but no satisfactory substitute will take its place.

The nasal mucosa is very sensitive and the introduction of probes or applicators within the cavity is painful and usually produces sneezing without its use. In order to allay this condition and also to reduce the swelling of the tissues which frequently hide from view the deeper structures of the nasal cavity, it is advisable to produce at least a partial cocainization. This may be accomplished in two ways: (1) by spraying into the nostrils a small amount of either a

2- or 4-per-cent aqueous solution of cocaine; (2) by the application of cotton pledgets to the mucous membrane moistened with the above solution; or, if a full dilatation is desired, add to the drachm 2 to 10 m. of 1:1000 adrenalin chloride solution.

In some individuals a full dilatation will be followed by a marked reaction, sneezing, stuffiness of nostrils, and a profuse serous discharge; usually much more marked where adrenalin chloride has been used. It is a wise plan to at least mention the possibility of some reaction occurring to the individual upon whom it is used the first time.

The shrinking of the turgid membranes of the nose in acute rhinitis with cocaine or cocaine and adrenalin, followed by drainage of pent-up secretions particularly from the anterior ethmoid cells, produces a certain amount of relief in no other way obtainable. After dilatation, if the nasal cavities are full of thick mucus, they may be cleansed by the normal salt douche; care being taken that the salt solution does not flow too rapidly, and that the patient breathes through the mouth and the return flow is unobstructed.

Cocaine hydrochloride in solution from 2 per cent on up to the so-called cocaine paste (composed of flaky crystals of cocaine and adrenalin chloride solution) is used extensively to produce anesthesia to mucous membranes. However, its use hypodermically has been very much lessened since the advent of novocaine, alypin, quinine and urea, etc.

Silver nitrate in a 2-per-cent aqueous solution is useful where a mild yet positive astringent action is desired in subacute nasopharyngitis. Slight pain and a peculiar burning sensation follows its use in the nasopharynx. In gaggy individuals the palate should be cocainized, and the cotton swab moistened with the 2-per-cent silver nitrate solution, and must be simply damp and not dripping.

In acute inflammations of the faucial mucous membranes and tonsils much higher per cent solutions are advisable—10, 15, 20, and 25; the last two are very useful in acute follicular tonsillitis; in some instances one application will abort an attack if applied in the primary stage.

Silver maxims: (*a*) The milder the inflammation the milder the solution. (*b*) The more intense the inflammation the stronger the solution. (Ballenger.)

Strong solutions of silver nitrate applied in subacute inflammations will probably irritate the existing condition; they coagulate the mucous secretions and blanch the mucous membranes, thereby producing a chemical trauma.

Whenever a solution of silver nitrate is used in the throat, care should be taken that none enters the larynx or a laryngeal spasm will result. The smallest amount will produce such a reaction as will not be easily forgotten.

Guaiacol should be used in 10-, 25- and 50-per-cent solutions in pure olive oil, in acute faucial and tonsil inflammations. The stronger solutions give best results in severe inflammations. Guaiacol may be applied pure in intense infections, usually with good results; yet it is not considered as efficient as the stronger solutions of silver nitrate.

Argyrol, a compound of a derived proteid and silver oxide, containing from 20 to 25 per cent of silver nitrate, is used when the silver nitrate solutions are too irritating. It may be used in 15- or 20-per-cent aqueous solutions in atomizers. It causes no irritation when used in the nasopharynx, and may be sprayed into the larynx without causing any spasm. A hard-rubber tube should extend into the solution in place of metal, as the latter will corrode; also remove residual amount of argyrol solution from any metal portion to avoid decomposition and consequent stoppage.

Small crystals may be inserted to the bottom of infected crypts of the tonsils, there allowed to dissolve, giving continuous application for considerable time.

In 15- to 25-per-cent aqueous solutions (warmed) a few minims may be dropped into an ear (after cleansing) that requires some mild antiseptic. However, it seldom is of value in a chronic discharging ear.

Acute inflammatory conditions of the larynx are greatly soothed by the inhalation of steam from a solution of hot water, one pint, compound tincture benzoin, one drachm; this may be used in a special inhaler for that purpose which is placed over the fire, or one can make a cornucopia out of cardboard, so the vessel containing the solution may set on the stove and the user will not be bothered by the heat.

In chronic granular pharyngitis, especially when the condition is somewhat irritated, compound tincture of benzoin may be applied full strength with good effect.

Gauze moistened with compound tincture of benzoin used for packing the nose will remain free from foul odor for a much longer period than plain packing.

Tincture of iodine, drachm j,
Glycerin, q. s. ad ounce j,

has long been used as a nasopharyngeal application. When stronger solutions of iodine are desired the following formula is to be recommended:

Iodine crystals, grs. ijss-x;
Potassium iodide, grs. vijss-xxx;
Glycerin, ounce j.

The stronger solution should never be used first; it is much better to start with the weaker and, if necessary, gradually increase the proportion of iodine, so there is some stinging when applied. After tonsillectomy in adults the iodine solutions may be used to promote healing; these are especially applicable where silver nitrate solutions cause pain in the wound and a reflex pain in the ears.

The weaker solutions of iodine in glycerin may be applied as a medicament on cotton tampons in atrophic rhinitis, also applied by cotton applicators to the mucous membranes of the nose after the crusts are removed.

On account of being found in nearly every home, and its importance as an antiseptic, makes carbolic acid added to boiled water (40-60 mins. to Oij) an excellent cleansing solution for the ear. In 4- to 10-per-cent solutions in glycerin (warmed) it is dropped into the external auditory canal in acute otitis media to allay the pain. The canal is filled, a piece of cotton placed in the ear, and then external heat applied. The frequent use of the strong percentages (10 to 12) is not advisable, for it is claimed that thickening of the drum membrane and diminution of hearing may result. However, in 6- to 8-per-cent solutions, even if used frequently, nothing will result from the chemical trauma, except possibly later on a partial exfoliation of the epidermis.

Carbolic acid combined with tannic acid, glycerin, oil peppermint, and water makes a gargle useful in acute tonsillitis, and a good preparation to employ after operative procedure upon the throat in adults.

Where a large perforation exists, or the drum membrane has been mostly destroyed and the aural discharge has an extremely foul odor, the boracic acid alcohol drops are of much benefit.

Boracic acid, grs. xx;
Ethyl alcohol, oz. j.

After the canal is cleansed and dried a diluted solution of the above is dropped into it and allowed to remain until all smarting ceases. It is best to start with a dilution of one to three and gradually increase until full strength is used. This solution in time will shrink the granulations, harden the tissues, and usually lessens both the odor and amount of the discharge.

Alcohol properly diluted makes a good astringent and antiseptic gargle for adults. The following is one of the best formulas:

Alcohol (ethyl),
Cinnamon water, āā ounce ij;
Formaldehyde, mins. ij;
Glycerin, drachms v;
Distilled water, q. s. ounce viij.

Oily solutions are of very little value, if any, for cleansing the nose, but serve for protection to the mucosa after the use of watery sprays or irrigations. The continuous use of oily sprays is apt to produce a feeling of dryness, on account of depleting the mucous membrane of moisture.

Aromatic, stimulating, and antiseptic drugs may be added as indicated, and the solution can either be dropped into the nose, or by the use of an oil spray or

nebulizer inhaled. The effect as a rule is for temporary relief, very little being accomplished toward curative measures. The following formulas are useful:

(1) Menthol crystals,
Camphor gum, ää grs. ij-x;
Bland petroleum oil, ounce j.

(2) Chloretone, grs. v;
Camphor,
Menthol, ää grs. x;
Oil cinnamon, mins. ij;
Refined liq. petroleum, ounce j.

This last preparation should be diluted, unless used with a nebulizer giving a fine vaporization.

Chloroform, carbolic acid, oil of thyme, oil of eucalyptol, oil of rose, oil of pine, aristol, acetozone, and other drugs may be used in various formulas.

During the past two years many formulas of nasal ointments have been put up in collapsible tubes for individual use. However, it is difficult for the patient to get the ointment to stick to the mucous membrane of the nose; it is either soon blown out or drawn into the nasopharynx and expectorated. Better results are obtained by having the application made just inside of the vestibule of the nose, where the ointment melts from the body heat and the medicines are drawn along the membranes. When crusting is present an ointment containing ichthyol may be massaged over the dried secretions to loosen the crusts and to stimulate glandular functions.

Boracic acid, zinc oxide, eucalyptol in petrolatum is an excellent preparation for use in infections of the vestibule of the nose, either in infection of the hair follicles or fissures of the epidermis.

Tubes of sterile vaselin are convenient to soften crusts which collect in the vestibule and following some operative procedures.

Para-amido-ethyl-benzoate, 10 per cent, with adrenalin chloride, 1:20,000, in a bland oleaginous base, is useful where an astringent, anesthetic ointment is desired.

Ichthyol, drachm j,
Ungt. zinc oxide, drachms iij,
Petrolatum, q. s. ounce j,

is indicated in acute eczema of the ear where the inflammatory reaction is well marked.

Carbolic acid, gtts. iij,
Ungt. zinc oxide, drachms iv,
Petrolatum, q. s. ounce j,

is indicated in auricular eczema where there is an abundance of pus.

Numerous cold and coryza tablets are at command; it is nearly impossible to add to the already abundant formulæ. Some individuals cannot take quinine; a few tablets containing one-tenth of a grain will cause disturbance. In such instances atropine sulphate, morphine sulphate, powdered camphor, and tincture aconite may be employed to suit the individual case.

In painful deglutition following throat operations, tonsillitis, tubercular and cancerous conditions of the throat, anesthesine lozenges frequently afford great relief. Where a simple throat astringent is desired red gum and catechu compound answers very well. The chloroform throat lozenge requires only mentioning, for its efficiency is well known.

NITROUS-OXIDE-OXYGEN ANALGESIA IN OBSTETRICS: A CONTRAST.

In the *New York Medical Journal* of April 29, 1916, as a result of the use of nitrous oxide and oxygen, Dr. F. K. Camp, of Oklahoma City, concludes:

1. That the time of labor was materially shortened, owing to the fact that the pains were so often more frequent and stronger, and partially, at least, to the fact that during the expulsive stage the patient, feeling no pain, brought the secondary muscles of expulsion to their best work.

2. Perineal lacerations with nitrous oxide gas, when given by an experienced administrator, were less frequent. This was due to the fact that when the head was on the perineum, the gas could be increased, temporarily slowing the contractions, and giving the tissues time to stretch. Dr. Davis had stated that in forty-four primiparæ to whom gas was given in the hospital, twenty showed some degree of laceration, or forty-five per cent, while with sixteen

primiparæ without gas, there was some degree of laceration in twelve cases, or seventy-five per cent.

3. In Camp's series of twenty-five cases all the babies cried as early and as vigorously as those who did not receive gas, and showed no signs of anesthesia.

4. Convalescence in those patients was in every way smoother and quicker than he had ever seen in a corresponding series of cases. More patients left the hospital under ten days after delivery than over twelve. Multiparæ were generally out of bed on the fifth day; primiparæ up in a chair on the sixth or seventh day. Dr. Davis attributed the rapid convalescence to the absence of shock under nitrous oxide gas analgesia.

5. The expense of the gas to produce the desired analgesia should not enter seriously into consideration, as in his series of cases it did not exceed ten dollars an hour, while the average time of giving the gas did not exceed three hours.

6. Unlike twilight sleep, which, its advocates state, should be used only in a hospital, nitrous-oxide-oxygen analgesia might be administered in the home, and portable gas machines for obstetrical work are now being manufactured. In these days of automobiles the doctor has little excuse for not adding this apparatus and method to his armamentarium.

ACUTE POLIOMYELITIS.

In the *Lancet* of April 15, 1916, BATTEN states that recognizing that poliomyelitis is an acute specific fever, having an incubation period of four to twelve days, the patient should be isolated. The infectivity is very slight, and in hospitals it is not necessary to place the patient in a separate ward, bed isolation being sufficient to prevent the chance of infection. As the virus is known to exist in the nasal and buccal mucous membrane, it is essential to pay careful attention to the discharge therefrom.

It has been shown experimentally that the serum of patients who have recovered from an attack of poliomyelitis has the power to destroy the virus *in vitro*, but that this immune serum has no power to prevent the development of the disease when injected simultaneously or after the virus has been injected. Flexner and Amoss have shown that intraspinal injection of an immune serum is effective when introduced in the preparalytic stage in delaying and preventing poliomyelitic infection in a monkey. This method of intraspinal injection of immune serum has been used with success by Netter in cases of poliomyelitis of the acute ascending variety. The method is as follows:

Some 20 to 30 Cc. of blood is obtained by venipuncture from a patient who has passed through an attack of poliomyelitis (the length of time after the attack is not important, for it has been shown that the blood preserves its antitoxic properties for several years). The serum is separated by allowing the blood to clot and by centrifugalization. Lumbar puncture is performed on the patient, and an amount of cerebrospinal fluid removed corresponding to that of the serum which it is proposed to inject—usually about 10 Cc. The serum is now slowly injected, and the bed of the patient tilted so as to allow it to gravitate cerebralwards, the injection being repeated daily for three to four days.

There is little or no difficulty in carrying out the treatment. The difficulty is to obtain an old case of poliomyelitis who has already been tested and given a negative Wassermann and who is willing to give the necessary blood at the same time as a suitable case of acute poliomyelitis presents itself for treatment. It is useless to carry out the treatment when the disease has already become quiescent, and the most suitable cases are those (1) presenting symptoms of an ascending or progressive poliomyelitis; (2) presenting meningeal symptoms; (3) in the preparalytic stage (if the diagnosis can be made).

Since animals are immune to poliomyelitis virus, the possibility of employing the sera of animals has been considered; but Flexner and Lewis found that the sera of

horses and rabbits had no viricidal action; sheep's serum was slightly active and might be increased by injection of the virus, but the degree of activity is small.

There can be no doubt that rest is the most important factor in treatment: the too early movement may in some cases restart the disease which has become quiescent. A child with an acute attack of poliomyelitis should be kept absolutely at rest in bed for at least three weeks. The principle by which physiological rest can be secured to the muscles is to be considered, and the conclusion arrived at is that the paralyzed muscles must be put into the "zero position," a position defined by Mackenzie as that in which the individual muscle itself is relaxed and both its own action and that of its opponents prevented. Sherrington has shown that postural contraction which counteracts the effect of gravity can be maintained for long periods without fatigue, and a position which can be maintained without fatigue must be a position of rest.

Various methods have been adopted for keeping the affected muscles at rest. Most of them tend to immobilize the patient for many months. It is important whilst keeping the completely paralyzed muscles in a normal zero position, and at rest, to encourage other muscles, which may have been more or less affected, to resume their normal function. This is accomplished by reëducation. The erect position and walking are the best forms of reëducation for the trunk muscles. The method of reeducating the severely paralyzed muscles is described below.

The practical application of the above principles has been carried out by placing the paralyzed limb or limbs in celluloid splints, accurately fitted to the limb as soon as it is possible to make the cast after the onset of the disease; as the splint is to serve in most cases not only for keeping the muscles at rest, but also as a support in walking, it is important that the position of the limb should be such that progression is possible. These splints were first used by Calot, and introduced into England by Gauvain, who has used them in the treatment of tuberculous joints.

The splint is molded on a plaster-of-Paris cast of the limb, and it is the taking of this cast that is important; for the limb must be in the zero position, or, in other words, the position normally assumed to counteract the effect of gravity when the patient is in the erect position. That position, so far as the legs are concerned, is one of slight flexion of the knees with the foot at a right angle, or an angle slightly greater than a right angle, to the tibia.

The advantages of this form of splint are: (1) They maintain the muscles constantly in a position of rest, for they can be worn day and night; (2) they do not immobilize the patient, so that walking exercise can be carried out without the liability to produce deformity or stretching of the muscles; (3) they are easily removed and replaced so that other methods of treatment can be carried out; (4) no special boots or shoes are required.

In reëducating a severely paralyzed muscle it is important in the early stages to place the limb in such a position that the load on the muscle is at its minimum, and only a very small force is required to overcome the effects of gravity. A bath is an excellent place to practice the reëducation of badly paralyzed muscles; for the weight of the limb is supported and ranges of movement are possible which without the support of the water are impossible. Walking exercises and the erect position are the best forms of reëducation for the trunk and abdominal muscles. When once the legs are splinted it is possible to get the patient into the erect position, and this allows of the physiological use of the back, trunk, and pelvic muscles. Such walking exercises are carried out by the use of a walking machine which supports the patient both physically and morally; for it is important to give the patient the feeling of complete security.

Other methods of treatment are by massage, electricity, and baths. The surgical treatment is not dealt with here.

During the last four years these postural

and reëducational lines of treatment have been carried out in all acute cases with the result that very few deformities have arisen. Such as have occurred were due to the contraction of the flexor group of muscles at the hip.

The adoption of the practice of placing the limb in a position of rest at an early stage of the disease will not only facilitate recovery, but prevent the greater proportion of deformities now seen as the result of poliomyelitis.

THE USE OF UNDILUTED CITRATED MILK IN THE FEEDING OF INFANTS.

CARTER writes on this subject in the *Practitioner* for February, 1916. He tells us that when he commenced this work he found that mothers did not realize the importance of measuring the quantities of food that they were giving to their babies, so that all elaborate mixtures had small chance of success. Professor Budin's experiment in Paris with undiluted sterilized milk prompted Carter to try a similar experiment in Kensington, substituting citrate of soda for the process of sterilization. In both instances clotting of the milk is prevented. Carter followed Budin's directions with regard to the quantity of milk to be given, viz., one-tenth of the body weight, but he soon found that the general condition of the child was a better guide than the body weight as to quantity, and that it was always safest to begin with small amounts, and gradually increase. Another point he found of great importance was to insist on clock-like regularity of feeding, and to make the intervals between the feeds as long as possible, so that the stomach was empty before the next meal. In order to insure regularity, it was necessary to write down the times of feeding on a card, which was handed to the mother, or whoever was in charge of the child.

Contrary to the generally accepted method of giving two grains of citrate of soda to each ounce of milk, Carter gave only one grain, and this was usually sufficient. He told the mother to add another grain if vomiting occurred. No specially prepared milk was used. He instructed the mothers to receive the milk in a clean jug, and then to place the jug in a saucepan of water, and allow the water to boil for five minutes. It is important that the milk should not be placed in a saucepan and boiled, because the "family saucepan" has a great deal of work to do in the houses of the poor and can rarely be called clean. After the heating process he advised that the jug should be covered over with a piece of muslin or clean paper, and the edges bound round with string; the jug now should be placed in a basin of cold water until required for use.

Each meal was prepared separately, and he found that this had a most excellent educational influence. Women who formerly had never thought of looking at the marks on the feeding bottles, or at any other form of measurement, now became interested, and for the first time in their lives realized the importance of quantities. Carter merely mentions these details to show how difficult work is amongst the poor and ignorant, whatever form of feeding is adopted, and he used whole citrated milk quite as much for the benefit of the mother as for the child. The value of this lesson has been fully justified in the case of many young mothers, whose subsequent babies progressed better than the first, because the mothers were able to carry out more elaborate formulæ, which, in many instances, produced better results than the whole-milk process. There can be no doubt that he got good results, on the whole, with undiluted citrated milk when he used it as a routine method during the first two or three years, but he has got much better results during the last six years by abandoning all routine methods and concentrating more on the individual requirements of the case.

The most successful case of feeding on whole milk occurred amongst wasted infants, and this is rather what one would expect. These cases had mostly been fed on very dilute mixtures, often containing

no additional fat or sugar; they commonly suffered from dilated stomachs, accompanied by vomiting and diarrhea. The citrated milk, on account of its small bulk, is particularly suitable in these conditions, and the excess of proteid can, no doubt, readily be utilized by the tissues for building up the framework of the body in cases of starvation. It is certainly a remarkable fact that the digestion of a weakly child is able to deal with whole milk, when all clot formation is prevented by the addition of citrate of soda.

Carter was not, however, satisfied that these good results were entirely due to whole-milk feeding, so he arranged to feed another series of wasted infants on mixtures of varying amounts of cow's milk, water, sugar of milk, and a "cream solution" consisting of equal parts of linseed oil and lime-water. In this latter series of cases he paid special attention to the intelligence of the mother. The exact amount of each constituent was carefully explained to her, and, in addition, the composition of each feed and the times for feeding were written down on a card, which she took home with her.

At the next and subsequent weekly visits the mother was cross-examined with regard to the quantities which she put into each bottle. It was evident that, when the child progressed, the mother took an increasing interest in the variations of each constituent of the diet, because she saw that it "paid."

Carter included 30 cases in each group, and they were under observation for three months. All the babies were young, and the general environment was very similar in both groups.

On comparing the results of these two groups, he found that the whole-milk feeding produced a more rapid rise in weight than the diluted milk feeding. In three instances the rise in weight of one pound a week was alarming, and he found that the mothers had not been attending regularly, and had increased the food without advice, with the result that, in two cases, the children became very ill, but did not die.

The weight-curve in the diluted milk series showed a more gradual rise, and the babies did not have any violent upset. The muscular development showed good progress in both groups amongst those who attended regularly, but here, again, the muscles showed a more rapid increase in the whole-milk babies.

Carter saw some of these cases when they were eighteen months old, and there were no signs of rickets in either group. Another difference was, that these observations were made in the winter months. In hot weather he has often had bad results, both with citrated and with dilute milk mixtures. He believes it is impossible to keep milk from becoming contaminated in the home during the summer-time, and, therefore, he puts all the children on a dried, full-cream milk while the warm weather lasts.

THE USE OF STOCK VACCINE IN INFECTION BY THE BACILLUS TYPHOSUS.

The *Lancet* of April 8, 1916, contains an article by WHITTINGTON on this topic. He states that in a total of vaccinated cases there were 29 in which it appeared that vaccine had a definite good influence. Of these, 20 belonged to Classes 3 and 4—*i.e.*, to those classes in which the prognosis is good. In other words, "good results" are more often obtained where good results can be expected by ordinary methods of treatment alone. On the other hand, the mortality rate and the average length of fever in these classes were slightly worse among the cases which had vaccine.

Among the cases belonging to Classes 1 and 2 in which the vaccine appeared to do good, none had severe lung involvement. Those cases which had much bronchitis or bronchopneumonia (the average severe case) ran the severe course which is usual and vaccine appeared to be of no avail. To say that if the average severity of the cases treated had been less the vaccine would have had better results is merely to say, Whittington thinks, that the cases would have done better anyhow.

From all this it would appear (*a*) that it is in just those cases in which the physician so much requires help that vaccine is disappointing; (*b*) that vaccine neither shortens the fever nor reduces the number of complications in even that class of case which is likely to do well; and (*c*) that there is a decided suspicion that vaccine increases the incidence of hemorrhage.

Therefore the conclusion is that the use of a stock vaccine in typhoid cannot be recommended as a routine treatment.

Whittington would add that these conclusions are largely contrary to the impressions which he received during the treatment of the earlier cases. He had not then seen a sufficient number of similar cases which did well without vaccine, and being rather biased in its favor he gave undeserved credit to this treatment.

THE PHYSICS OF A SURGICAL DRESSING.

PRIMROSE (*British Medical Journal,* Feb. 12, 1916) holds that the best dressing for a septic wound is the moist dressing, and regards hypochlorous acid solution as wonderfully effective. Everything should be done to favor free evaporation and absorption into the dressing, which should be frequently changed. Primrose believes it would be greatly to the advantage of the wounded if impermeable protective and oiled silk were entirely removed from the surgical armamentarium of the army. He states that he has seen dozens of cases in a short time of the employment of impermeable coverings over moist dressings. He observes that by far the majority of all septic wounds admitted have had an impermeable covering. The custom is unquestionably wide-spread.

Primrose quotes Wright's advice to the effect that in the field ambulance there should be applied the wet dressing of 5-percent solution of sodium chloride and 5-percent sodium citrate, and over this dressing should come a layer of impervious tissue. From this method Primrose entirely dissents, stating that his attention was first called to the harmful use of impermeable material such as protective, oiled silk, rubber adhesive, etc., by a paper on the physics of a surgical dressing published about ten or fifteen years ago in the *Annales de l'Institut Pasteur.* He recalls by memory experiments which seem to show that animals prepared by shaving a portion of the skin surface and after excoriating sufficiently to draw blood, would die of strychnine poisoning if this area were covered with impermeable oiled silk so that evaporation of the surface was prevented. Under a simple absorbent dressing no sepsis resulted. Similar experiments with virulent bacteria showed similar results.

SODIUM HYPOCHLORITE IN THE TREATMENT OF SEPTIC WOUNDS.

DALTON (*British Medical Journal,* Jan. 22, 1916) as a member of a committee sent to report on the efficiency of the hypochlorites in the treatment of infected wounds, notes that every wounded patient received on board during this period, whose wound or wounds were clinically septic on arrival, had been treated with the special sodium hypochlorite solution prepared according to Dakin's formula. No other form of antiseptic was employed. Although this report is based on the small total of 57 cases, the results have been so uniformly and consistently good that he thinks it may be useful to publish it now, in order that the hypochlorite solution may be more generally used in the treatment of wounds than is the case at present.

Wounds that were clinically clean on arrival on board were also irrigated with the sodium hypochlorite solution and dressed with gauze soaked in the antiseptic. But these cases are not considered in connection with this report, since they would probably have remained clean and healed with any other form of customary dressing, and therefore cannot be counted as evidence in favor of hypochlorites being far superior to any other form of antiseptic that they have so far used on board the ship.

The antiseptic solution is made on board from dry carbonate of soda, bleaching powder of good quality, and boric acid, according to Dakin's directions given in the *British Medical Journal* of August 28, 1915. The solution was made in large carboys holding about 40 liters.

Five hundred and fifty grammes of the carbonate of soda were dissolved in a carboy half-filled with fresh water; 800 grammes of bleaching powder were then added, and the mixture thoroughly shaken for five minutes. The carboy was then filled up with fresh water, and, shaking the mixture once more, it was allowed to settle for half an hour. The clear fluid over the precipitate of calcium carbonate was siphoned off as completely as possible, and filtered into a second carboy by passing through a plug of cotton in the neck of a large funnel; 150 grammes of boric acid were added to the filtrate, and the mixture was then ready for use. It was drawn off from the carboy as needed by means of a siphon.

The solution was never kept longer than a week, and any unused solution that had been made longer than a week was thrown overboard. This waste is a matter of no moment since the cost of the preparation is so extremely small.

The usual surgical procedures were adopted for enlarging the wound, making counter openings, removing portions of detached bone, foreign bodies, including bits of clothing, fragments of shell, bullets, etc. Every portion of the wound was then thoroughly irrigated with large quantities of the hypochlorite solution. One or several rubber tubes, according to the nature of the wound, serving for the introduction of the hypochlorite solution, were then inserted, and strips of gauze arranged around the tubes and lightly packed into every portion of the wound. It is essential that this should be properly done, the idea being that the gauze strips function simply as wicks to convey fresh hypochlorite during subsequent treatment to every surface of the wound.

The outer surface of the wound is then dressed with gauze lightly wrung out in the hypochlorite solution. The ends of the rubber tube or tubes are brought out through the gauze dressings, a bandage lightly applied over all to keep the tubes and dressing in position, and the ends of the tubes brought out through the bandage, to serve for the subsequent renewal of the hypochlorite.

In profoundly septic cases the hypochlorite solution is injected into the tubes, by means of a glass syringe, every two hours for the first twenty-four to forty-eight hours, and subsequently less frequently as the wound begins to clean up. In less severe cases they find by experience that syringing with hypochlorite at four-hourly intervals suffices. Each case should be treated, so far as frequency and quantity of hypochlorite administration is concerned. The object aimed at is to supply every surface of the wound with a sufficiency of fresh hypochlorite solution as often as required.

In bad cases the gauze strips are renewed after the first twenty-four hours. With slighter wounds they may be left in for three to four days, and then usually do not need to be replaced by fresh strips, as the wound generally cleans up with simply occasional squirting of fresh solution into the tubes.

A SIGN OF FRACTURE OF THE PELVIS.

Coopernail (*Medical Record,* March 4, 1916) states that in practically all cases of fracture of the pelvis there will appear in from one to three days a more or less extensive ecchymosis of the perineum and scrotum in men, perineum and labia in women. In cases of not very extensive fractures of the crest of the ilium this sign may not be present.

In fractures of the pubic portion of the pelvic ring (which is the most common fracture), invariably one will find ecchymosis of perineum and scrotum inside of three days.

The diagnosis of fractures of the pelvis in many cases is far from easy. Localized

tenderness at the seat of fracture may be the only sign present at the time of injury. Crepitus, the cardinal sign in so many fractures of other bones, is often absent, and in most cases there is comparatively little or no displacement.

This sign does not compare with the *x*-ray in diagnosis of fractures of the pelvis, but it will be found to be of interest, and will be a help to make a diagnosis before using the *x*-ray.

Ecchymosis of the perineum will be found present in a much larger percentage of cases of pelvic fractures than is ecchymosis behind the ear and under the conjunctiva in cases of fracture of the base of the skull (Battle's sign), to which it is analogous.

PROGRESS IN GYNECOLOGY.

RUSHMORE (*Boston Medical and Surgical Journal*, Feb. 24, 1916) observes that the present enthusiasm for radium as a standard for operation in the treatment of cancer of the uterus is not soundly based on fact. The radical operation in the hands of competent men still gives the best results in spite of the high essential mortality. Cobb's report upon the review of the work on cancer of the uterus at the Massachusetts General Hospital is distinctly serviceable, he noting that of six cases operated on over five years ago by the complete method five are well. The combination of ether with spinal anesthesia is deemed very satisfactory. The growth is curetted or cauterized at the time of operation or a few days before. The ureters must be widely freed. The tying of the internal iliac artery is advocated and employed, especially in the cases of ineradicable growths. After operation the peritoneum should be closed off entirely from the field of operation, and the extraperitoneal raw area should be drained by a small piece of iodoform gauze which does not come in contact with the ureters. Salt solution is given freely by the rectum, and the bladder is cared for by the use of urotropin and an inlying catheter.

Zweifel strongly advocates secondary operations. His indications for operation are that the tumor or recurrence must be sharply defined on all sides, and only a small part of the periphery may be attached to the pelvic wall; involvement of the bladder does not preclude operation; immobility of recurrence is often due to connective tissue and not to actual tumor growth. Zweifel found 20 cases in which secondary operation was possible, in three of which there was no recurrence on microscopic examination of the nodule removed. In the 17 remaining cases, five survived operations for periods from four years and five months to ten years and eight months. One of these patients underwent five operations for recurrence, and at the age of seventy-five was free four and one-half years from the latest. Three cases died as the result of operation, one of septic peritonitis, the second of an abscess which burrowed from the abdominal incision, and the third on the fifty-third day from embolus following phlebitis of the left leg.

The high percentage of cures in those cases in which exploratory operation showed removal to be possible, suggests the advisability of more frequent resort to such method of treatment.

Much has been written on the use of radium in the treatment of cancer of the uterus, but the known results can be stated briefly. Ransohoff advocates its use in inoperable cases, in which it gives great relief. Some of these cases may prove later to be cured. He does not accept Kroenig's dictum that it should be used in every case to the exclusion of operation, though all acknowledge that the five-year limit only will show the final test.

The line of treatment laid down by Ransohoff is in accord with the practice of most operators at the present time, to operate in cases in which the growth seems eradicable. While not in favor of preoperative radiation on account of material increase in the difficulty of operation, he advocates postoperative treatment as a prophylactic measure against recurrence. If radium is effective for three and one-half centimeters only, even this range of

applicability would cover most of the operable cases. If the carcinoma has advanced more than this distance the case is a borderline case, one of those which the surgeon so often wishes he had not attempted when he gets down to the growth.

Pinch, the medical superintendent of the Radium Institute of London, says cancer of the uterus is favorably affected by radium, both in inoperable and operable cases, though it is not proper to speak as yet of a cure. If extensive operations have been carried out, great care is necessary in the postoperative use of radium, employing smaller amounts and thicker screens. Unless these precautions are observed, a severe and extensive destructive reaction may follow. This may be attributed to operative interference with the trophic nerves in the pelvis. If radium has been applied to the vagina, douches should be used night and morning for six weeks, at least, to prevent adhesive vaginitis. In some extremely susceptible cases a transient proctitis has been noted after the intra-vaginal treatment.

Von Seuffert states that no method hitherto described gives as satisfactory immediate results in cancer of the uterus, whether the case be operable or inoperable. There is no doubt that a number of patients now living two years after radium treatment are clinically as well as if no cancer had ever been present. There are few free for over five years. It is recognized at present that the depth of penetration is an important factor. Some cases of glandular metastasis have survived operation more than five years without recurrence, and tests of the penetration of radium indicate three and one-half centimeters as its limit.

Through recent refinements in technique, the effects of radium in the body can be controlled so that there seems to be a so-called elective or specific action on carcinoma cells.

Allman commends radium, but comments adversely on the use of cholin, which has been so strongly recommended by some, on account of the disagreeable constitutional symptoms of which the patients complain.

Cheron and Rubens-Duval prefer massive doses and report favorable results. For metropathies at about the time of the climacteric, *x*-ray gives excellent results in the hands of all who have tried it. Radium or mesothorium seems to be no better, not indicated, or more dangerous, though few had used them for this condition. For myomata the results are very good if bleeding is the only symptom and no complications are present.

Kroenig recommends radiation except in cases of younger women in whom enucleation is possible.

Radiation gives immediate results, which are favorable in most cases of inoperable cancer. Abbe and Kelly report successful cases of fibroid. Marek treated by radium chiefly those patients in whom operation is contraindicated. In 16 cases nine were cured, four were improved, and three were failures. Kroenig and Gauss alone claim one hundred per cent of cures. In a series of operative cases by Marek in which 104 were abdominal and 18 vaginal, there were three deaths, which were attributed to the advanced stage of the disease rather than to the operation. In a second series of 125 cases there was one death, following a vaginal myomectomy; death occurred on the sixteenth day from pulmonary embolus. Even with low hemoglobin the patients do well. Operation is performed with the hemoglobin as low as 20 per cent. Supravaginal operation is preferred. The more thoroughly malignancy is looked for the more thoroughly it is found, Bumm claiming as high as 10 per cent.

Gardner reports 55 cases of round ligament suspension of the uterus in which the Gillian operation or some of its modifications was used. In all of these the retrodisplacement was the predominant lesion, though other conditions demanding treatment also occurred, as laceration of the cervix and perineum, and adhesions of tube or ovary. Forty-one were entirely relieved; in six, anatomical but not symptomatic cure was the result. In no case in which examination was made was the uterus out of position. The technique followed was median incision to peritoneal cavity; ex-

posure of sheath of rectus on each side of the median line; puncture of the rectus and underlying peritoneum about an inch from the median line and one and one-half inches from the symphysis; through this perforation the round ligament was drawn and sutured to the fascia. In some cases there was oblique puncture of the muscle to the internal inguinal ring. The puncturing instrument then passed along the round ligament and through the peritoneum at the point at which the round ligament was to be grasped. When drawing the round ligament out obliquely in this way certain objections to the technique are avoided.

Williams concludes that the perineum and the levator ani muscle have little to do with the support of the uterus. He concludes that the supports of the uterus and the bladder are intimately connected or identical, and that the uterus receives its support at the level of the supravaginal cervix from the pelvic fascia. He emphasizes the importance of fascia in the operation for radical cure.

ANTHRAX.

ULLMAN (*Surgery, Gynecology and Obstetrics*, April, 1916) states that the bacillus of anthrax usually enters by way of the fingers, hands, forearms, face, head, or neck. Probably the first symptom noticed is the irritable, burning point at the site of infection. The redness at this point spreads; at the same time the swelling increases. There may be also red lines under the skin radiating away from the point of infection, and the spot becomes increasingly tender.

The patient complains of weakness, malaise, rarely more than chilliness, though there may be a moderate rigor, headache, and occasionally vomiting.

If the infection is located in the stomach, obstinate vomiting will very likely be present. In the intestinal type, persistent diarrhea is a marked feature. The pulmonary type gives the symptoms of pneumonia, frequently with cyanosis and collapse. Brain symptoms such as coma or convulsions may be present in any of the above-mentioned types, though usually the patient remains conscious throughout the attack. The febrile curve is not unlike that of other acute infectious diseases—usually ranging from 102° to 105° F.

The occupation of the patient is significant. The condition should be differentiated from furuncle, carbuncle, erysipelas, and malignant edema. The furuncle is conical, does not form vesicles, and its areola is not edematous. The slough is not dry, or dark in color. In erysipelas the sharply defined edges of inflammation, the higher fever in the beginning, and earlier prostration will usually differentiate the two. In malignant edema there is the definite history of injury, marked pain, rapidly spreading gangrene, and emphysema, terminating in twenty-four to forty-eight hours.

Of course the smears or cultures from the point of infection will show the bacillus anthracis and clear up all doubt.

In some instances, before we are able to obtain the organisms, the diagnosis is possible by means of the Ascoli reaction by precipitin. The "ring formation," a peculiar cloudiness, appears promptly and distinctly by employment of the extractive substances from the spleen.

In taking up the treatment the prophylaxis is of the utmost importance. All discharges from the animal or patient should be thoroughly disinfected or burned. The bodies of animals or human beings dying of this disease should be covered by wrappings soaked in an efficient disinfectant and burned. No post-mortem examination should be allowed. Flies, mosquitoes, and other insects have been shown to convey the infection and should therefore be guarded against. It has been shown by Osler that the ordinary processes of tanning do not affect the spores. Animals may be protected from infection by vaccinating with attenuated, non-spore-forming cultures. Every farmer is familiar with this method.

The curative treatment is admitted by all to be essentially surgical. Wide incision at

the point of infection with efficient drainage, and hot, moist, antiseptic applications, if instituted early, offer the greatest hope of recovery.

Of course all sorts of medication have been tried. Some propose emesis and purgation in order to free the alimentary canal from as many bacilli as possible. Others hope to obtain the same results by the use of quinine (in doses of from 15 to 60 grains per day), or by combining quinine and carbolic acid; or the use of a solution of iodine and potassium iodide internally.

Injections of a 5-per-cent solution of carbolic acid into the tissues at the outer edges of the edematous area are claimed to be of value.

Probably the administration of Sclavo's serum offers more hope than any other agent. Sclavo states that he relies upon this alone. In a large number of cutaneous cases his mortality-rate was only 6.09 per cent as compared with 24.1 per cent for all cases in Italy.

Sclavo recommends the use of doses of 40 Cc. divided into four parts; but Bandi (quoted by Keen) has used as much as 150 Cc. Bandi contends that the method of Sclavo fails because there is not a sufficient quantity of the antitoxin to neutralize the virulence of the poisons of the disease. Kept cool in a dark place the serum remains fully active for at least two years.

Bouchard and Carrhin claim that the toxin of bacillus pyocyaneus has a curative effect in anthrax. The injection of this toxin, or the use of the carbolic injections, should be undertaken if the serum cannot be had.

RUBBER GLOVES.

Morris (*Medical Record*, March 4, 1916) discusses this subject as follows:

First, let us take up the matter of principles. According to the fundamental ideas of the third or pathological era of surgery, the operator was to remove bacteria and their products most thoroughly from any infected area. This called for a degree of technical work which represented progress, but nevertheless often proved injurious to the patient. Furthermore, it was frequently unnecessary. We are now passing into the fourth or physiological era of surgery.

The main idea about which our new methods are grouped consists in giving the patient the mildest attack of surgery which will suffice for turning the tide of battle between bacterium and organic cell. It is the idea of conserving the patient's energies and turning him over to himself as expeditiously as possible—in other words, giving him "home rule." Most surgeons cannot introduce their nicest manual technique when wearing gloves.

The methods of the fourth era of surgery include the idea of the least possible degree of handling of sentient tissues, and the shortest incisions which will suffice for accomplishing an object without jeopardizing any of the patient's interests. Furthermore, rapid work is desirable in order to avoid sending prolonged destructive influence into the patient's centers of consciousness, which are never wholly asleep, no matter what degree of anesthesia may be employed. Regarding this, Dr. T. L. Bennett says that the best surgeon is the one who acts all of the time as though he were afraid of waking the patient.

In order to follow the principles of this fourth era of surgery, one needs to depend very largely upon the sense of touch. We often have to work by touch in a class of cases in which the phrase "expose all of the pathology" belongs to the third or pathological era of surgery, now passing. It is better not to expose all of the patient's pathology in many of these cases in which we already know what that pathology is, and what the patient will be able to do with his repair machinery if he is not shocked too deeply.

In some cases a large incision and tedious technical ideal work will allow many more bacteria to fall into a wound from the air than would be carried in by well-prepared surgical hands.

This matter of careful preparation of surgical hands is sometimes neglected by men who put too much confidence in their rubber gloves. Morris states that he would

not advocate any idea which jeopardized the patient's interests. On this basis he made at one time a quiet examination of hospital records of a number of surgeons who worked without gloves, and of a number who worked with gloves. Some of those who depended upon careful preparation of the hands had fewer cases of infection than were recorded against other operators who used rubber gloves in all of their operative work.

The advantage of working by the sense of touch in preference to the sense of sight in certain cases has been recognized by surgeons since the earliest days of surgical history. The sense of touch is dulled by the best of gloves.

The operator in a case of perforated ulcer of the stomach, working by sense of touch, may introduce drains down to the region of perforation and complete his preliminary operation in three or four minutes of time, leaving subsequent details for a secondary operation.

In typhoid perforation, or in cases for drainage of the fluid belonging to parenteral anaerobes in typhoid hemorrhage, the entire operation from first incision to last suture may sometimes be done in seconds instead of minutes when one is working by the sense of touch.

When removing firmly adherent organs like oviducts in cases of pyosalpinx, or the appendix in acute infective cases, work may be done through short incisions by aid of the sense of touch very rapidly and accurately. Long incisions naturally predispose to the development of postoperative hernia, if the patient has the luck to live and face that danger.

For cases in which we need to be particular about scarring, one will often work to advantage through incisions which could not be employed if the sense of sight were our chief dependence.

On the other hand, rubber gloves may be worn to advantage in almost all of the so-called "external operations," such as amputations or excisions, or hernia. Surgeons there be who are not well trained in the principles of asepsis or of antisepsis, yet who are doing a great deal of operating. For such operators he prescribes the employment of rubber gloves under all circumstances.

RENAL AND URETERAL CALCULUS.

CABOT (*Transactions of the American Association of Genito-Urinary Surgeons*, vol. x, 1915), dealing with errors in diagnosis of renal and ureteral calculus, notes that of 150 cases in which the urine was carefully examined, in 21 it was found to be entirely normal. Stone in the ureter is more likely to be accompanied by normal urine than when the calculus is placed in the kidney. Abdominal pain entirely without colic was the presenting symptom in 13 of the cases, while backache was the chief complaint in 11. In 12 the pain was in the right lower quadrant.

On these 153 cases 26 abdominal operations had been done without relief of the symptoms, which were clearly due to the overlooked calculus in kidney or ureter.

In 127 cases in which satisfactory *x*-rays were obtained, eight were persistently negative, representing a failure of 6 per cent. He regards 15 per cent as nearer the real percentage of failures.

Pain referred to the stomach and vomiting were the chief complaints in three cases; sacroiliac pain and pain called lumbago in three cases; and pain referred to the bladder in seven. Patients, declared neurasthenics, have been those with abdominal pain, negative physical examination, and a normal urine. Two such patients had stone in the ureter, the removal of which cured the neurasthenia.

In cases suggesting stone in the kidney with normal urine, a negative *x*-ray, and an unobstructed ureter, the wax-tipped catheter will not infrequently lead to a correct diagnosis and will be likely to fail only in the cases in which the stone lies in a dilated calyx and is therefore out of reach of the catheter.

He also calls attention to the fact that all cases of abdominal pain of a chronic or recurring type, cases of backache, lumbar

or sacroiliac joint strain and lumbago, should be subjected to repeated examinations of the urine and should usually have *x*-ray plates taken.

Squier holds that a peculiarity of true renal pain is that it never becomes paroxysmal but is always characterized by dull, constant aching. It is usually associated with local tenderness, best elicited by fist percussion. The pain is located deeply by the patient. Distention of the renal pelvis and upper third of the ureter is associated with urinary frequency, but usually without painful micturition.

PROGRESS IN GYNECOLOGY.

Under this title RUSHMORE (*Boston Medical and Surgical Journal,* March 2, 1916) quotes Kosminski regarding experimental work on the relations of the hypophysis to the genital glands. He also makes a clinical report on twenty cases of amenorrhea which he has treated by hypodermic injections of pituitrin or hypophysin. He has seen no bad effects, and a sufficient number of cases have been cured or improved to make the treatment worth trying, though, as he says, not all cases of amenorrhea without obvious cause are due to defective secretion of the hypophysis. In the present state of our ignorance the injection should be tried, as it seems to do no harm and may do some good.

In the therapy of amenorrhea without obvious cause—that is, without mechanical obstruction, chlorosis, profound anemia, or other constitutional disease—the so-called idiopathic amenorrhea, which perhaps rests on a functional disturbance of the uterus or of the ovary, or of both—Rieck has found the intrauterine plug most useful. The particular form of instrument which he uses as being the most satisfactory he found on the market, invented and put on sale "for preventing conception." It can be easily introduced, and in his series of nineteen cases, over a number of years, has given excellent results. Most of these patients had been subjected to other forms of treatment without avail. The plug is left in for several months, and is retained in place by the constriction of the internal os, which contracts below a small knob at the upper end of the plug. The prejudice against the plug Rieck attributes to the defective mechanical construction of the old forms.

In some cases the plug happened to stay in for several years; in one eight years; then it was spontaneously expelled at miscarriage. Rarely does this give symptoms, but in one case it had to be removed. In a few cases there was complete failure, but in these the plug was apparently left in too short a time. In one patient the plug was removed after seven months of amenorrhea, which has remained permanent. The indications for the use of the plug are amenorrhea or "oligorrhea" of months or years duration.

The use of the intrauterine stem pessary for the treatment of dysmenorrhea and sterility is increasing of late, according to Nicholson. Soon after the introduction of this device it encountered considerable opposition, which has recently diminished. Some operators regard it as perfectly safe, others as requiring great care in its employment, while still others regard it as "unsurgical" and to be avoided unconditionally. Nicholson, whose advocacy of the stem pessary dates back only a few years, reports a case of severe pelvic infection ensuing three weeks after the introduction of a plug in a patient in whom no other source of infection could be found. Ultimately an abdominal operation had to be undertaken with removal of one tube and ovary and resection of the other. While the infection could not be proved to be due to the plug, the absence of any previous symptoms on the part of the patient and entire freedom of infection of the husband, as shown by two examinations, make this explanation seem the most probable to Nicholson. This case calls attention to something with which every operator is familiar, that even a slight and seemingly safe operation may be followed by unexpected and serious results.

Novak, following the suggestion of

Drenkhahn, exhibited atropine in cases of spasmodic dysmenorrhea in young women with gratifying results. In such cases he makes no pelvic examination (generally there is nothing to be made out), but begins the administration of the drug two days before menstruation is expected to appear and continues for two or three days, according to the usual duration of the pain, one one-hundredth of a grain three times a day. If pain appears, the dose is increased unless signs of atropine saturation are present. The dryness of the throat and the itching of the skin are usually easily tolerated. In some cases he has employed other drugs also, as aspirin.

Another drug which gives relief to some cases of dysmenorrhea is citric acid. Given in the form of sodium citrate three times a day, it is claimed to reduce the viscosity of the blood, and thus alleviate the pain of expulsion. Spitzig has found that the nausea, dizziness, headache, and mental irritability are vastly improved, and that clots and membranes (*sic*) are reduced.

SUBACROMIAL BURSITIS.

BRICKNER (*American Journal of Surgery*, April, 1916) on the basis of a personal study of over 100 cases of shoulder disability, including 19 which showed calcareous deposit roentgenologically, 7 of which he operated upon, concludes as follows:

A much-thickened bursal wall casts no roentgen shadow. The shadow is due to a calcareous deposit.

The calcareous deposit is not in but entirely beneath the bursa, in or on the supraspinatus tendon, or occasionally the infraspinatus near its insertion.

The assumption of a bacterial or toxic origin for subacromial bursitis has never been substantiated by any evidence.

Excluding the rare tuberculous form and the metastatic purulent type occurring in septic processes, subacromial bursitis is of traumatic origin. It is produced by bruising the structure between the acromion and the greater tuberosity (over which latter the adhesions and the thickening of the bursal wall are most often found). When the underlying tendon is likewise contused or torn, the lime salts deposit in the area of necrosis that develops in this poorly vascularized tissue.

In the early stages there may be swelling due to serous effusions in the bursa. In later stages swelling in the deltoid region is unusual; more often there is decided flattening due to muscle atony. Tenderness over the outer aspect of the shoulder just over the acromion, where it is usually sought for, is as often absent as present (more often absent). The site of tenderness is most constant in subacromial bursitis anteriorly, over the lesser tuberosity.

The recommendation in text-books to "excise the bursa" is to be condemned.

The subacromial is one of the largest bursæ in the body. Above it is adherent to the under surface of the acromion process and the coraco-acromial ligament, wherefrom it is reflected onto the joint capsule. Below it is adherent to the inner surface of the deltoid muscle, extending fully one and a half inches distal to the greater tuberosity. Anteriorly and posteriorly it encircles almost one-half the circumference of the humerus, and is attached by its under surface to the bone, the joint capsule, the biceps sheath, and the tendons of the subscapularis and the spinati. Surely the complete removal of this extensive, intimately attached structure would be an imposing task! For an attempt to perform it there is but a single indication—tuberculosis.

Calcareous shoulder deposits occur apparently only in adults. Probably some metabolic disturbance predisposes to their formation, and since the condition is not a rare but a fairly common one, it is worth determining, if possible, what that disturbance is. It is clear that those who recommend extirpation of the bursa mean thereby merely removal of the diseased portion. Calcareous deposits in the bursa do not occur, but calcification is a familiar process in necrosed tissues, and has been described.

not infrequently in tendons that have undergone necrosis. The cause is probably an injury to the tendon.

TRANSPLANTATION OF BONE IN UNUNITED FRACTURE OF THE SHAFT OF THE HUMERUS.

HENDERSON (*Annals of Surgery*, April, 1916) has practiced two distinct methods: one the intramedullary plug, the other the inlay. The latter he prefers. Of ten patients there were three with musculospiral paralysis at the time of examination. In two the nerve fibers were apparently intact. In another case, paralysis of the musculospiral nerve was produced by excessive manipulation and traction at the time of the operation.

One point of technique which is highly commendable lies in the fact that he applies a spica plaster-of-Paris casing to the shoulder and arm of the fractured side a few days before the operation. This gives as near perfect fixation as it is possible to obtain; the cast embracing the wrist, elbow, shoulder, and thorax. Before putting on this case a dressing is placed on the arm about the size necessary to protect the wound after operation. During the application the wrist is held in mild hyperextension so that it will be retained in this position, the extensor muscles of the forearm being thus relaxed and not stretched. The elbow is put up in a flexed position with the arm rotated inward so that the forearm rests across the front of the body. After the plaster has hardened sufficiently to allow of cutting with a sharp knife, the cast is split into anterior and posterior halves, which can be readily applied and held in place by adhesive strips after the operation is completed. This method is resorted to since it is rather difficult to apply a good plaster spica to the shoulder with the patient asleep.

Inlay grafts are obtained from the flat internal surface of one of the tibias, preferably by the circular motor-propelled saw. They should be long enough to extend well into the sound bone of the ends of the shaft. A graft 6 inches long by ½ inch wide is the ordinary size desired. The failures in Henderson's cases were traced to two causes—too small a graft and inadequate fixation postoperatively and during convalescence. The grafts are held in place by double strands of No. 2 chromic catgut or single strands of kangaroo tendon, placed around the humerus by aid of a ligature carrier. The wound is closed with silkworm and horsehair. The patient is placed in the split spica cast, which is strapped together with adhesive plaster. At the end of two weeks the stitches are removed and a new plaster-of-Paris cast applied. Henderson particularly dwells upon adequate postoperative fixation.

By removing the bone-graft from the flat internal surface of the tibia, the strong crest of the bone is left to perform its important weight-bearing function. The patient may be allowed to walk in from twelve to fourteen days. At this time the blood-clot filling in the bony defect has become sufficiently organized so that no hemorrhages will occur on the use of the leg.

A properly applied spica cast may be comfortably worn for three months, when in all probability union will be complete.

END RESULTS OF UMBILICAL HERNIA.

SIMMONS (*Boston Medical and Surgical Journal*, March 9, 1916) reports on 70 consecutive cases operated upon at the Massachusetts General Hospital. The length of time during which cases were followed varied from one to four years. The cases practically always recur, if they are going to do so, in the first year, and it would seem proper to report all of these cases as end results. There were 15 umbilical herniæ in children and small herniæ in adults which were operated upon incidentally in the course of another operation, but for which the patient did not seek medical advice. There were 43 cases of large umbilical hernia of slow growth in stout, middle-aged adults, usually women. Many

of them were complicated by cardiac insufficiency or pelvic trouble, as prolapse. There were 12 strangulated herniæ.

The operation was performed as follows: An oval transverse incision is made about the umbilicus, including the hernia mass. This is carried straight down to the fascia. The mass of fat and hernia is then dissected toward the ring, keeping close to the aponeurosis, and all hemorrhage from the small perforating veins carefully controlled. By keeping gentle traction on the hernia mass, these can usually be seen and clamped before being cut, and the operation in this manner is done almost bloodlessly. The dissection is carried to the edge of the ring and the anatomical structures developed until finally the mass of hernia and fat can be lifted up, being attached to the body only by the sac. The sac is then opened, close to the ring, the contents freed from adhesions and returned to the abdominal cavity, or, if omentum, excised. The ring is then closed by the Mayo method, transversely, with an overlap from above downward, by five Pagenstecher mattress sutures. Especial care should be taken in closing the ends of the wound, as it is at this point that recurrence is particularly likely to occur. In some cases the peritoneum may be closed by a separate stitch, but it is usually impossible, as at the umbilicus the peritoneum is very friable and difficult to differentiate. The free edge of the aponeurosis is caught down with chromic gut sutures and the wound closed with buried catgut sutures in the fat to obliterate the dead spaces.

Ten of the Group I cases were followed, and all of them remained well. In such cases it makes very little difference what operation is performed since it is always successful. In the second group, two of the 43 cases died following operation. In one fatal case hysterectomy was done at the same time. Thirty-nine of the cases have been traced. To these have been added six cases of strangulated hernia which survived the operation, a radical cure being attempted at the time of intervention. Of these 45 cases the hernia recurred in 10. In 30 cases the Mayo operation was performed, with three recurrences, or 10 per cent. In the fourteen cases in which the ring was closed vertically, with or without overlapping of the aponeurosis, six recurred, or 42.8 per cent. The only case closed transversely, without overlapping, recurred.

Local sepsis apparently played little part in the recurring cases. Of the 31 clean cases six recurred; while of the 14 cases in which there was local sepsis, three recurred. Four of the recurrent cases were sutured with chromic catgut, two with kangaroo tendon, and three with non-absorbable suture material. Of the 43 cases in Group II, 14 showed some form of sepsis after operation, one of these cases having phlebitis. In two of the cases there was a large ulcer at the time of operation. The sepsis was in every case of low grade and very mild, but prevented absolute healing by first intention. The wounds healed apparently by primary union, but at the end of from one to two weeks a pocket of serum and "oil" formed under the skin, which necessitated evacuation. Following this the sinus persisted, or closed in a few weeks. In some cases the serum became infected, forming a superficial abscess. In one case several sinuses persisted for three months, at the end of which time a Wassermann was taken, and found positive. Healing occurred promptly after the administration of salvarsan.

PYLORIC EXCLUSION.

LEWISOHN (*Surgery, Gynecology and Obstetrics,* April, 1916) notes that the vast majority of surgeons agree that pyloric exclusion ought to be added to gastrojejunostomy to insure the permanent cure of pyloric and duodenal ulcers. There still exists a great difference of opinion as to the best method of accomplishing this exclusion. Lewisohn considers that the arguments about the permanent anatomical exclusion of the pylorus and about the preference of one method over the other are rather futile. Practically none of the simple exclusive operations will insure per-

manent occlusion. All that is necessary to attain the result of a clinical cure is to prevent food and stomach juice coming in contact with the ulcer for a few months and possibly for a few weeks only. A temporary absolute exclusion of the pylorus, not a permanent one, is needed. This purpose is just as well obtained by the exclusion stitch with a Pagenstecher suture, which seems to be technically the most simple procedure, as by any of the other more complicated methods.

FINAL REPORT OF THE COMMISSION ON VENEREAL DISEASES.

This interesting document is thus commented upon by the *Lancet* of March 11, 1916:

"The Final Report of the Royal Commission appointed in November, 1913, 'to inquire into the prevalence of venereal diseases in the United Kingdom, their effects upon the health of the community, and the means by which those effects can be alleviated or prevented,' was issued last week, with a full knowledge on the part of the Commissioners of the disadvantages of promulgating the report at a time when all public activities are centered upon meeting the manifold needs of the gigantic war in which the nation is engaged. The Commissioners, who were unanimous in signing the main report, were, however, of the opinion that early issue of their views would be advantageous, as the conditions to the investigation of which the appointment of the Commission was due, while existing now, must continue on the conclusion of the war. Their course is one with which all must agree, for those conditions will require remedial action at the earliest opportunity if they are to be dealt with in any practical and comprehensive manner; indeed, we should have welcomed some advice from the Commissioners as to making use now of the instructional opportunities offered by the aggregation in camps of the larger part of our vigorous young manhood. Such an opportunity for giving impressive counsel to crowds who need it will not readily recur. This is not said in any spirit of criticism. For the Report is a document of the first interest to the nation, and it should be read as a whole so as properly to understand the comparative value of the general conclusions and of the evidence upon which they are based. We publish in another column the summary of recommendations and the general conclusions in full, many of which, in their opinion, must have been largely foreseen by the medical profession. That no system of regulation would be favorably mentioned was certain, and that no mode of notification of venereal disease would be recommended was thought probable, as medical opinion is still divided on this point. We think that notification will probably follow on the better instruction of the public in the sequelæ of venereal diseases. The difficulty of determining the real prevalence of these diseases in the country, which it was felt would be experienced by the Commissioners, made it appear likely that some form of confidential registration of causes of death would be suggested as well as arrangements for the compilation of accurate statistics. Perhaps this authoritative report may lead to the reform in our national ways of taking stock by figures, a reform which only last week we suggested was very necessary. In this connection the third recommendation of the Commissioners is exactly to the point.

"The first section of the Report summarizes briefly the previous action taken by the State in this country to control venereal diseases. The story of the Contagious Diseases Acts is set out, and the fact of their repeal thirty years ago is briefly noted, the Commissioners being precluded by the terms of reference from considering the policy of regulation. They seem to have interpreted this limitation as enjoining them not to mention the subject of prostitution, and this gap in their advice to the State will have later to be filled. They place on record, however, their view based on evidence given by experts at home and abroad, that no advantage would accrue from a return to the system instituted under the Contagious Diseases Acts, while they note in support of this the great im-

provement as regards venereal disease in the navy and army which has taken place since the repeal of those Acts. Except in the case of the navy and army there are at present no means of arriving at an accurate estimate of the present prevalence and distribution of venereal diseases. The Commissioners come to the general conclusion, as regards prevalence, that the incidence of both syphilis and gonorrhea is much lower in rural than in urban areas, and as regards the great cities this may be taken as absolutely proven without the least acquiescence in the tentative view that at least 10 per cent of the population of such cities are affected. We find the assumption of so great a prevalence hardly justified in face of the wide-spread belief of the medical profession that the incidence of these diseases in all classes of the population has become definitely lighter. The statistical part of the report is the one which will give the least satisfaction, and many will feel that, apart from certain special inquiries, not much is here set down that is of paramount value. We make exception in favor of the investigations of Dr. Paul Fildes into the prevalence of syphilis among the apparently healthy adult inhabitants of the East End of London; of Sir John Collie into the manifestations of syphilis among 2274 persons referred for medical report by large employers of labor; of the Lister Institute into the occurrence of syphilis among persons admitted to certain asylums; and of Dr. F. W. Mott and Mr. N. Bishop Harman, to which we refer below.

"It is only in comparatively recent years that the full effects of venereal diseases have been recognized, and in the third section of the Report these effects are discussed from the clinical standpoint. The little essay on syphilis thus furnished, describing its early and late results, the danger of spirochætal infection of the walls of the arteries, and the possible production of deadly affections of the brain and spinal cord, makes terrible reading, and reminds us over and over again how much wider our knowledge of the subject has become in recent years. And it is this fact which renders an estimation of the actual prevalence of syphilis particularly difficult, for while it is the wide-spread impression of medical men that the disease is not so rife as it was even twenty years ago, they must recognize as syphilitic phenomena conditions to which wholly different origins were formerly given. Upon gonorrhea the pronouncement of the Commissioners is no less impressive than it is upon syphilis, and in insisting upon the wide-spread mischief which may follow in its train for both sexes, the particularly sad result of sterility in the female is noted in the following comment:

"Gonorrhea is said to be the commonest cause both of absolute and relative sterility in women, probably 50 per cent of all causes. It prevents conception in the early stages by hindering the living germs on which impregnation depends from reaching the uterus, and also by destroying their vitality. Impregnation would therefore appear to be impossible during an acute attack of gonorrhea, and although pregnancy may possibly occur during the subacute stage it not infrequently ends in miscarriage owing to the inflammation from the vagina creeping into the lower zone of the uterus. Should the child be carried to term, the risk of infection of the tubes and ovaries is greatly increased. This leads to such alteration in the structure of these essential organs as to cause the well-known 'one-child fertility.' When complicated by streptococcic and staphylococcic infection gonorrhea may lead to puerperal sepsis and death.

"We agree with the Commissioners that knowledge of these facts should cause both the medical profession and the public to take a far more serious view of gonorrhea than has hitherto been adopted. For this and other reasons we wish for the Report a wide circulation among the public. It will help greatly to obtain universal cooperation in any remedial measures which may be designed to meet the conditions produced by venereal diseases, that the public should be made aware of the influence of syphilis in producing hereditary and congenital disability of a terrible sort. This is illustrated by diagrams contributed

by Dr. Mott on untreated or inadequately treated syphilis, which prove the disastrous results of the infection of a parent. On an adjoining page in the Report will be found a diagram furnished by Mr. Bishop Harman showing the proportions of blindness in children due to venereal diseases, and the lesson is enforced by a statement of the same observer that of 1100 children in London blind schools 31.2 per cent of cases were certainly, and in addition 2.8 per cent were probably, due to syphilis.

"Under the head of the treatment of syphilis, mercurial and arsenical courses are discussed, and the summaries of the reports regarding the drugs used in this country as substitutes for the German products of salvarsan and neosalvarsan show these new substances to be very satisfactory. A part of the evidence to this effect has been already published in our columns, and goes to indicate that kharsivan and galyl are of the greatest possible value. Wisely the Commissioners say, having regard to the fact that in all cases successful treatment must largely depend upon the assistance of the patient, that instructions should be given in the clearest possible manner as to the contagious nature of syphilis, as to the duration of the infection, and as to the necessity for treatment being by a doctor, not by a quack, and being persevered with at medical discretion. For the first time we think the position of the married woman is definitely recognized, as in the report it is suggested that no one who has, or has had, syphilis should marry without medical permission. A similar instruction is recommended in cases of gonorrhea, and the special danger of communicating the disease to the wife is dwelt upon, while the Commissioners recommend that venereal disease should be a ground for nullity of marriage. We agree wholly with this opinion on a sad situation, and also with the statement in the ninth recommendation that institutional treatment for venereal disease should as far as possible be provided at general hospitals. Indeed, we look forward to the day when the general hospitals, in the presence of an enlightened public, will wage systematic war on venereal disease through the medium of highly instructed staffs, both senior and junior. When we all know more, the terrors of venereal disease—real, as they are, beyond description—will be met squarely and dissipated promptly. We read this optimistic forecast into a document of studied moderation."

CHOLECYSTECTOMY.

DEAVER (*Annals of Surgery*, April, 1916) thus describes his technique: With the abdomen open, the gall-bladder and the right free border of the gastrohepatic omentum freed of adhesions (not that there are adhesions in all cases), this region is thoroughly walled off, when with retractors the assistant keeps the wound wide open. The edge of the liver and the fundus of the gall-bladder are grasped with the left hand carrying a piece of moist gauze, pulled downward, outward, and upward, which makes taut the cystic duct and the free border of the gastrohepatic omentum.

When the liver is adherent to the parietal peritoneum to the degree that it would not be wise to attempt severing the adhesions, it will not be possible to dislocate the liver in the above manner. In the presence of a diverticulum (a dilatation of the gall-bladder at its junction with the cystic duct, sometimes called the pelvis), the diverticulum conceals the upper portion of the gastrohepatic omentum and is frequently adherent to it. In either of the above conditions the cystic duct and the free border of the gastrohepatic omentum, between the layers of which lies the duct, are made prominent by grasping either the gall-bladder or the diverticulum with a long pair of curved forceps and making traction.

Where the diverticulum is adherent to the free border of the gastrohepatic omentum, it must be freed before effective traction can be made upon the cystic duct. Unless this be carefully done the common duct may be injured, as occurred in one of the writer's cases. A small incision is made through the upper part of the free border of the gastrohepatic omentum and the cystic duct exposed. The cystic duct

at its junction with the gall-bladder is clamped with a long pair of hemostatic forceps and cut across distal to the forceps with the actual cautery. A small piece of gauze is placed beneath the border of the gastrohepatic omentum to take up the bile that escapes when the cystic duct is divided. A small, followed by a larger, probe is passed into the stump of the open cystic duct and carried through the common duct into the duodenum, in this wise determining whether the duct and the papilla of Vater are patulous. Before the probe is withdrawn from the common duct, the duct is palpated by grasping the descending duodenum and head of the pancreas between the fingers and thumb of the free hand, when it is definitely settled whether the common duct contains a stone or stones. Further, by this means, if the duct contains a stone which is not detected by the probe and yet the probe has passed into the duodenum, through the wall of which the end of the probe can be felt, the stone will be palpated and it can also be determined if there be obstruction outside of the duct. Next, the cystic artery, lying above and to the inner side of the cystic duct, is clamped and cut. In a small percentage of cases the cystic artery lies below and to the outer side of the cystic duct. If it is not necessary to drain the common duct through the stump of the cystic, the cystic duct is ligated and next the cystic artery.

The next step is the separation of the gall-bladder from the liver.

This dissection is made from below upward, the gall-bladder is freed and turned upward and outward, and the gall-bladder bed closed by carrying a continuous catgut suture through the liver substance forming the sides and floor of the gall-bladder bed. The free end of the suture is left long and tied to the portion of the suture the needle carries through the liver substance. The tie is made on the upper side of the line of apposition of the walls of the gall-bladder bed. It will be seen that as the gall-bladder is removed step by step the suture is passed and tied, so that when the gall-bladder is entirely removed the gall-bladder bed is completely closed; by this means the procedure is made a bloodless one. He regards this as far preferable to packing the gall-bladder bed with gauze or placing a cigarette drain therein and retaining it by suture. In a small percentage of cases where the walls of the gall-bladder are not extensively infiltrated, it will suffice to incise the serosa in the long axis of the organ upon either side sufficiently far from where it is attached to the liver to cover the gall-bladder bed when the edges are apposed by a continuous catgut suture. The lateral flaps of the serosa are reflected and the gall-bladder removed from below upward, leaving enough of the fibrous coat so as not to trespass upon the liver. There are a few instances in which a gall-bladder can, to better advantage and with greater safety, be removed from above downward, commencing the dissection at the fundus.

The next step is suturing the divided layers of the gastrohepatic omentum, but not covering in the stump of the cystic duct. The final step is the placing of a small rubber tube down to and just beyond the free border of the gastrohepatic omentum, which is retained for four or five days, so that in the event of the ligature on the cystic duct giving way the bile will have an exit. Occasionally a glass tube is used, when it is replaced the following day by a rubber tube, the latter being small enough to be carried down the glass tube and the glass tube withdrawn. When the gall-bladder is so large that access to the cystic duct is difficult, it may be aspirated or opened and emptied, care being taken to guard against infecting the field of operation, when the removal, as above described, can be made. In some cases of gangrenous and phlegmonous gall-bladders the operation is made a little more difficult than in ordinary cases, yet this technique can be carried out.

Drainage of the common duct by way of the stump of the cyst duct is only a temporary procedure. When, as is frequently the case, it is necessary to have prolonged drainage of the common duct, he opens the common duct and introduces a T-shaped rubber drainage tube. Dr.

Riesman and the author have one patient who is wearing such a tube now going on three years. The author has a number of patients wearing these tubes. This form of drainage is introduced in certain cases of pancreatic lymphangitis, chronic interstitial and interacinar pancreatitis.

Early drainage of the common duct by this method or by a cholecystoduodenostomy is the only chance for the cure of pancreatic diabetes. Metabolic studies will never cure pancreatic diabetes, only the early use of the aseptic scalpel and establishing drainage before infection has caused a serious pancreatic lymphangitis, a forerunner of chronic pancreatitis, and this in turn of pancreatic diabetes.

POSTOPERATIVE TETANUS.

SPEED (*Surgery, Gynecology and Obstetrics*, April, 1916) calls attention to the habitat of the tetanus bacillus and the wide diffusion of its spores. It is noted that about 5 per cent of human beings show tetanus bacilli in their stools, the average varying from 2 to 20 per cent, the higher proportion existing in men who work about horses and stables. It has been shown that enormous doses of tetanus toxin may be introduced into the stomachs of animals without causing death, that these animals do not become immunized, and that their blood serum has not antitoxic properties. It was also determined that ptyalin destroyed the toxin, that gastric juice attenuated it, and that bile and pancreatic juice destroyed it totally. It is evident that the intestinal flora exert a partially destructive action on tetanus toxin, but the mucosa has no influence.

In tetanus infections bacilli have been found in the milk and in the lymphatic nodes, muscles, and nerves. The pathogeny of tetanus infections is a complex phenomenon which must have the simultaneous help of several factors. Pure tetanus spores freed from tetanus toxin of the culture and injected by the millions into the healthy tissues of an animal are harmless. When the spores are deprived of their preëxisting toxin they are devoured by phagocytes, but if some of the same spores in small quantities are injected into the same animal's tissues when the spores are artificially protected against phagocytic action, tetanus is produced. As an example of this requirement a guinea-pig, an animal very susceptible to tetanus, will resist large numbers of toxin-free tetanus spores introduced subcutaneously or intraperitoneally. These animals, however, will succumb to tetanus when but a few spores are injected mixed with unsterile sand or enclosed in a collodion sac. The foreign material with the spores acts as a barrier to the leucocytic action of the host, tetanus toxin is developed, and the animal dies from the absorption of the diffused poison.

For the development of tetanus in man one must have an infection with the specific germ and favorable conditions for its growth in accordance with the requirements described. Simple injuries, superficial and practically aseptic in character, do not favor the growth of tetanus spores. Trauma alone is not a sufficient aid. When tetanus develops in man we must look first for other auxiliary factors in the infected tissue, such as burning, extensive crushing or hematoma formations, all of which may be called traumatic results. Secondly, we must look for associated microörganisms. Necrotized tissue from burns, crushes, and ligated areas, and collections of blood within tissues, favor the growth of tetanus because the usual leucocytic resistance is held at bay.

Tetanus organisms are usually encountered in soils or manure mixed with many other microörganisms, all of which may be expected to enter a soiled wound under equal chances for growth. Some of these added bacteria favor tetanic growth, others do not, a fact easily verified clinically when the enormous number of infections are considered in comparison with the few tetanic developments. In man we must have an inflamed wound with more or less suppuration for the growth of tetanus bacilli. Experiments upon animals have verified these statements. An amount of garden soil infected with tetanus is divided into two portions and moistened. One

part is injected into a guinea-pig; it dies of tetanus. The other part is heated to 80° C., a point which does not destroy tetanus spores, but does other non-sporulating organisms. After injection of the heated soil no local lesion of importance results and no tetanus develops. If later favorable microörganisms are added to heated soil and injections are made of it into susceptible animals, tetanic death results. In practical treatment of wounds antiseptic irrigations and applications may not kill the tetanus organisms, but they do kill or greatly reduce in number associated organisms which assist in tetanic growth, probably by consuming oxygen.

Tetanus in civil practice has become almost eradicated by the prophylactic use of antitoxin and the antiseptic treatment of dirty, contused, and lacerated wounds. Cases of non-traumatic tetanus still persist, especially the unforeseen postoperative cases.

Spontaneous or non-traumatic tetanus must be instituted from either pathologic or physiologic processes, and the usual entrance of the infection is through the outer covering of the body, seldom through the internal organs. Wounds of the navel in the new-born, and postpartum and abortion infections in adults, may be considered as physiologic wounds. Pathologic wounds are found after injections, vaccination, and after operations.

The following forms of non-traumatic tetanus are possible:

Cryptogenetic or rheumatic tetanus, which occurs as a delayed infection after a trauma or an unknown atrium of infection.

Tetanus after skin lesions. These may be very simple and unsuspected as an infection atrium. Kirmisson has reported two cases and Broca one case of fatal tetanus in children from the use of felt pads to compress the spine in the treatment of scoliosis by Abbott's method; small skin excoriations made by pulling the felt pads under the body encasements of plaster became the seat of tetanic development. Organisms were found on the felt. Sterilization of the felt before use is now considered necessary. The skin lesions may be—

In connection with mechanical lesions, such as ulcers of the leg, infected tumors, nasal excoriations, or paraphimosis.

In connection with bacterial skin lesions.

In connection with thermic lesions, as burns or frost-bites.

Tetanus from the respiratory and digestive tracts.

This includes also infections through the ear, a few of which are known. Through a healthy lung the infection is not possible, but in chronic bronchitis, bronchiectasis, or lung-abscess cases have been found. Infection via the tonsils is known. Luckett has recorded a fatal case of tetanus in a child with the point of infection in the cavity of a tooth. Tetanus bacilli were found among other organisms in the tooth, and their character was proved by inoculation experiments. Intestinal infections in tetanus carriers may have been the cause of many of the cryptogenetic or rheumatic cases.

A few cases in connection with typhoid fever, pericecal abscesses, or fecal impactions in the rectum have been recorded.

Tetanus after injections may occur from hypodermic needles, from infection carried in from the skin surface, or from mixtures injected, such as gelatin.

Tetanus after vaccination. Usually from secondary infection by tetanus bacilli, rarely and practically never at this time from the vaccine. McFarland collected 14 postvaccinal tetanic infections, all secondary. Wadsworth, reviewing the cases of tetanus in Philadelphia for the twenty-five years from 1885 to 1909, found twelve postvaccinal cases, nine of which were doubtful as to the origin of the infection and were probably secondary, while three seemed to be primary infections from the vaccination.

Tetanus after operation. In this class the author places tetanic infections occurring after elective operations in cases which are classed as clean from the first. The possible avenues of infection are: The operator's hands; the instruments, dressings, and ligatures; air infection; and the patient himself. This last source has been considered remote, and Matas was the first to call serious attention to it. A large majority of the reported postoperative cases

in the preaseptic and early aseptic era were connected with operations in the female pelvis.

Wilms in the ten years from 1868 to 1879 found five cases after herniotomy. Because postoperative tetanus has not disappeared from aseptic surgery operators have been forced to seek a cause for the infection on which to lay the blame. Naturally animal ligatures—catgut—have become the cynosure. Two points in that connection are worthy of attention. In the early days of catgut use for buried suture and ligature, very little was ever said or noted concerning tetanic infection from it. In the first decade of this century, in spite of the enormous amount of catgut used there are only some sixty cases of tetanic infection which are even remotely attributed to its use.

In surgery, operations other than laparotomy occur twice as often as opening the abdomen, and more ligatures are used in them, but in 19 of the 21 cases collected by Richardson the operation was a laparotomy, and handling or suturing of the bowel was performed. Richardson cited the experience of one operator who on a certain morning performed five laparotomies, using the same preparation of catgut. Patients number 3 and 4 in this series, a gall-stone case and an appendectomy respectively, developed tetanus, but the other cases did not.

In 1909 Matas called attention to the risk of tetanus infection in operations on sterile tissues in which postoperative asepsis cannot be assured. Operations on those parts of the body exposed to fecal contamination are the doubtful ones because of infection derived from fecal discharge. The genitourinary organs of both sexes, the anorectal regions, the sacrococcygeal region, and the inner surfaces of the thigh or legs, or any other part of the body which might be contaminated, lie in this class. After two personal cases Matas advised abstinence by the patient for several days prior to operation from such foods as might carry tetanus. Raw vegetables and other food, as lettuce, celery, cabbage, watercress, radishes, tomatoes, etc., and raw fruits, as strawberries, blackberries, etc., must be removed from the diet and a free catharsis instituted for three or four days previous to operations on the areas named previously.

Atkinson in 1915 reported a case of postoperative tetanus following removal of hemorrhoids, and found that there were but six other cases.

In view of the various experimental and bacteriological data mentioned in the biologic considerations, it seems possible that some human beings carry and excrete tetanus organisms for long periods and are really tetanus carriers. Their greatest danger is to themselves, because after operative procedures which permit fecal contamination of the wound tetanus may be inaugurated. This is particularly true of abdominal operations where the gut is bruised or roughly handled, and opportunity for tetanus development ensues in accordance with the pathologic requirements. The possibility of hematogenous infection must also be weighed. Considering the great number of anorectal, gynecologic, and intestinal operations and the few postoperative cases of tetanus resulting therefrom, it seems that we may attribute those few which are exceptionally occurring in spite of preoperative preparation to tetanus carriers.

RENORENAL REFLEX PAIN.

In a discussion of this subject H. A. FOWLER (*Surgery, Gynecology and Obstetrics,* April, 1916) concludes that the symptom of pain arising from disease in one kidney may be referred entirely and completely to the opposite side, the latter organ being healthy so far as they were able to ascertain by present methods of examination. In the absence of any demonstrable lesion either within or outside of the kidney sufficient to account for such localization of symptoms, we are justified in assuming the pain to be reflex—renorenal reflex pain.

Cases of renorenal reflex pain are rare. Only a relatively small number have been reported in detail.

The importance of this phenomenon, from the standpoint of diagnosis, is not as great as it once was. Errors in diagnosis

are not so apt to occur from misleading subjective symptoms since the employment of more accurate means of examination—*x*-ray, cystoscopy, ureter catheterization, and renal functional tests—has become more general. The occurrence of this phenomenon, however, emphasizes the importance of a thorough and complete preoperative examination of every case of suspected renal calculus.

REVIEWS.

PLAGUE. Its Cause and the Manner of its Extension, its Menace, its Control and Suppression, its Diagnosis and Treatment. By Thomas Wright Jackson, M.D. With Bacterial Observations, by Dr. Otto Schöbel. Illustrated. J. B. Lippincott Company, Philadelphia, 1916.

The constant presence of plague among lower animals on the Pacific Coast for a number of years makes it needful that American physicians shall have clear conceptions in regard to this disease, the more so because of its extraordinary prevalence and mortality in other parts of the world. Dr. Jackson has had ample opportunity, by virtue of tropical service, to study the disease in person and also to come in contact with other medical men who have had large experience in its control, both as an epidemic and in the individual. Having been at one time a lecturer upon Tropical Medicine in the Jefferson College he knows how to present his facts in an interesting and educational form. Altogether he divides his theme into four chapters. In the introductory remarks he discusses the history of plague and its method of extension, and points out that during recent years it has been present in Porto Rico, New Orleans, and Manila. He then discusses its bacteriology, and after this considers its control, and then discusses the importance of the extermination of rats and other rodents. The last chapter deals with the necessity of having the diagnosis made by a trained bacteriologist, gives the necessary bacteriological procedures, describes the symptoms which lead clinically to the diagnosis of plague, and, finally, deals with the use of serum as a protective agent and with the use of plague vaccine.

Incidentally, it will interest our readers to know the efficiency of various methods of catching rats. Thus, the author states that in three months there were 120,565 spring or snap traps set, and that for every 100 traps there were caught 6.9 rats. During the same period there were 47,075 wire cage traps set, but the total number of rats was 339, which gives 0.72 caught for each trap set, indicating that the spring trap is infinitely preferable to the cage trap. It was also found that traps were infinitely preferable to poisoned food as a means of destroying these rodents. Notwithstanding the cheapness of poison methods as opposed to trap methods, in the long run the trap is the more economical method of the two.

As illustrative of what an active antirat campaign can accomplish it is interesting to note that from July 1, 1912, until June 30, 1913, the total catch in the city of Manila was 55,101, and that in the remaining six months of 1913 the total was 79,676 rats. The author very properly believes that this campaign distinctly checked the spread of plague in Manila in 1913 and that the antirat campaign should be persistently maintained.

RULES FROM RECOVERY OF TUBERCULOSIS. A Layman's Handbook of Treatment. By Lawrason Brown, M.D. Second Edition, Thoroughly Revised. Lea & Febiger, Philadelphia, 1916. Price $1.25.

We have often pointed out that the physician who attempts to write for the laity sets himself a difficult task. On one hand, it is by no means easy to present medical facts in language which is not technical, and, on the other hand, it is all too easy to give false impressions by reason of the avoidance of medical terms which have a very definite meaning. Dr. Brown has been peculiarly fortunate in his effort and presents for the perusal of those who are ill

with tuberculosis, or of those who are taking care of tuberculous patients, text which may be honestly said to be sane and safe.

His chief object, he tells us, has been to help patients avoid blunders, and the text was written primarily for his own patients. He has attempted to make clear the whys and wherefores of many rules ordinarily given to patients, for he believes that the day has come when the physician shall look upon his patient not as an ignorant child but as a human being endowed with more or less intelligence.

There are twenty-five chapters in this little book of 184 pages discussing Rest, Food, The Use of Alcohol and Tobacco, Living Outdoors, The Temperature of the Body, The Weight, and the General Hygienic Care of the Patient.

We are interested to note that in the chapter devoted to Alcohol and Tobacco, the author takes the view that alcohol has little value in the treatment of tuberculosis, although he admits that it is used more largely in private sanatoria in Europe at the present time than in this country. Of course, the whole problem of the use of alcohol in these cases must be decided on the individual case, as to his constitution and as to his disease. In discussing the influence of tobacco in tuberculosis, the author well says that as a matter of fact tobacco injures fewer men than does excess in eating. The position which he takes is that cigarettes irritate the throat, that moderate smoking for a healthy adult exerts little harm, and the fact that it soothes and quiets some men cannot be denied.

So much has been said in regard to the use of tuberculin in the treatment of tuberculosis that we look with interest at Chapter 20, in which the author discusses this important subject. We rather admire his temerity in dealing with a matter for the laity about which there is so much difference of opinion amongst medical men. The chapter, however, covers only two pages. He states very sensibly that just how tuberculin acts is not fully understood. In an all too small number of patients the results from its use have been remarkable; that another small group cannot tolerate it at all; and that the vast majority of patients take it well, although they experience comparatively little benefit from its use. All of these statements are based, however, upon the tuberculin being administered by some one who is skilled in its use and to a patient who is under absolute control and prepared for hourly observation if necessary.

THE INTERNATIONAL MEDICAL ANNUAL. William Wood & Co., New York, 1916. Price $4.00.

For many years we have reviewed each issue of the International Medical Annual, which is published simultaneously in Great Britain and the United States. As in the past there are many contributors from Great Britain and few from this country. This is eminently proper in view of the fact that the Annual originates on the other side of the water.

It opens with a Review of Therapeutic Progress for 1915, followed by a Dictionary of Remedies, and then a discussion of Radioactivity and Electrotherapeutics, with Surgical Progress, Blood Examinations, Cerebrospinal Fever, Syphilis, Typhoid Fever, and Mental Diseases. At the foot of each article the chief reference to the matter considered is given. There are quite a number of colored plates, which are well executed, most of them being from microscopic preparations. There are also a large number of black-and-white drawings and black-and-white plates. The International Medical Annual of 1916 fully maintains the excellent characteristics of preceding volumes.

PROGRESSIVE MEDICINE. A Quarterly Digest of Advances, Discoveries, and Improvements in the Medical and Surgical Sciences. Edited by H. A. Hare, M.D., Assisted by L. F. Appleman, M.D. Volume 2. June, 1916. Lea & Febiger, Philadelphia, 1916.

The June issue of Progressive Medicine contains, as in previous years, a summarization of Hernia by Dr. William B. Coley, of New York; The Surgery of the Abdomen, Exclusive of Hernia, by Dr. John C. A. Gerster, of New York; Gynecology, by Dr. John G. Clark, of Philadelphia; Dis-

eases of the Blood, Diathetic and Metabolic Diseases, Diseases of the Thyroid Gland, Spleen, Nutrition and the Lymphatic System, by Dr. Alfred Stengel, of Philadelphia; and Ophthalmology, by Dr. Edward Jackson, of Denver.

The volume is copiously illustrated, and the authors have adhered to the primary plan devised at the first publication of this quarterly, namely, that in the discussion of contributions made during the past twelve months, they express their own views and utter criticisms of other writers whenever these criticisms will add to the interest and value of the text.

GYNECOLOGY. By William P. Graves, M.D., F.A.C.S. Illustrated. W. B. Saunders Company, Philadelphia and London, 1916. Cloth $7 net; half-morocco $8.50 net.

The author having designed his work as both a text-book and a general reference book of Gynecology has adopted a special classification devoting the first part to the Physiology of the Pelvic Organs and the Relationship of Gynecology to the General Organism.

The second part is designed primarily for the undergraduate student who is taking an initial course in Gynecology. It includes a description of those diseases which are essentially gynecologic.

The third part is devoted exclusively to the technique of gynecological surgery, and is written for the assistance of the advanced student and practitioner.

Of particular interest is a small subsection entitled Relationship of Gynecology to the Organs of Internal Secretion, a truly admirable summary of the little that is really known concerning these glands and their correlation.

Considering the question of castration, the author states that no specific psychic or neurotic reaction follows castration in the adult, if properly performed. He admits that various vasomotor phenomena may develop, which are relieved by ovarian extract.

A brief but very satisfactory discussion of organotherapy is given. The relationship of Gynecology to the Skin, the Special Senses, the Stomach, the Organs of Respiration, the Blood, the Organs of Circulation, and the Nervous System are taken up both in detail and with a refreshing spirit of broad philosophy.

Part II begins with Gonorrhea, continues with Tuberculosis, and thereafter takes up General Inflammatory Processes and New Growths and Effects of Development, Malpositions and Injuries due to Childbirth. Thereafter follow special gynecological diseases, including under these Ectopic Pregnancy, Membranous Dysmenorrhea, Sterility, and Uterine Insufficiency. Finally there follows a small section on General Symptomatology and Gynecology. The last section, excellently illustrated in Bröedel's style, though not by him, includes a brief, clear, and satisfactory description of the usual gynecological operations. In this section are Operations on the Abdominal Wall, including that for the repair of umbilical hernia. Finally there is a brief section on Operations on the Kidneys, Ureters, and Rectum.

It is a text-book in the fullest sense of the term, with a strong personal touch, and worthy of high praise.

INTERNATIONAL CLINICS. Volume III, 25th Series. Edited by Henry W. Cattell, A.M., M.D. J. B. Lippincott Company, Philadelphia and London, 1915.

This always interesting and instructive volume contains many serviceable articles, among others a short treatise on Gonorrhea and its Complications and Sequelæ. A large subject, which the author has covered to his apparent satisfaction in 34 pages, concluding with the remark: "If treatment is followed as outlined here the short duration of the attack and absence of complications will be particularly gratifying to both the surgeon and the patient."

Among other aphorisms the author states that "local anesthesia must never be used in the urethra while passing sounds since it frequently masks symptoms."

As to office technique, "the patient is requested to remove his clothing, and a sterile suit of pajamas is put on. The trousers of the suit are slit from waist

behind to waistband in front, so that the genitals may be readily exposed for examination."

It is stated that when acute posterior urethritis is already evident strenuous treatment of the posterior urethra must follow. If the patient presents himself with an epididymitis local treatment of the anterior urethra should begin at once. The author's secret of success lies in frequent repetition of injections of nargol.

There is an excellent paper upon "The Educational Treatment of Ataxia," by Morris Grossman, and an interesting paper upon "Therapeutic Technic," by William Brady, in which aloes is called, with perhaps unconscious humor, "a pile-driving physic."

Newlin writes briefly upon "Some Unusual Cases of Abdominal Pain." There are some case reports not without interest. Some War Experiences in Germany and France by Rahm. A clinical and very excellent study of the Malingerer by Glueck.

Roberts's contribution on "The Treatment of Fracture of the Lower End of the Radius by Reduction and Contour Splints" is thoroughly rational. Altogether the book contains much that is instructive and entertaining.

BONE-GRAFT SURGERY. By Fred H. Albee, A.B., M.D., F.A.C.S. Illustrated. W. B. Saunders Company, Philadelphia and London, 1915. Cloth $6 net; half-morocco $7.50 net.

This work deals with the direct accurate implantation of autogenous bone-graft contacting corresponding structures of graft and host bone—*i.e.*, periosteum to periosteum, compact bone to compact bone, endosteum to endosteum, and marrow to marrow. Moreover, it is an extremely satisfactory description of the author's technique. In this respect it differs widely from the usual text-book, nor is there evidence of any but a sincere desire to help those who believe in the methods described and wish to practice them.

The first chapter is devoted to the fundamental principles underlying the use of bone-graft in surgery. Thereafter is described the author's motor and technique of its use. Thereafter follow The Bone Graft in the Treatment of Pott's Disease and Other Lesions of the Spine; The Inlay Bone Graft in the Operative Treatment of Fractures; Operative Methods for Remodeling or Ankylosing the Hip-joint; The Use of the Graft; Fixation of Tuberculous Knee-joints; Infantile Paralysis; Osteoarthropathy; Bone-graft and Disease and Deformities of the Foot and Leg; and Miscellaneous Surgical Uses of the Bone-graft.

Actuated as it is by belief and enthusiasm and standardizing a branch of surgery little understood and less practiced, this book is of great value to the active surgeon.

EMBRYOLOGY, ANATOMY, AND DISEASES OF THE UMBILICUS, TOGETHER WITH DISEASES OF THE URACHUS. By Thomas Stephen Cullen. Illustrated by Max Brödel. W. B. Saunders Company, Philadelphia and London, 1916.

Few people can read the title of this work without experiencing a distinct sense of amazement. Still fewer can close the book, printed in Saunder's best style, illustrated with Brödel's maximum skill, and exhibiting to an astonishing degree a patient and honest research, without a distinct sense of admiration for its author and of indebtedness to him in that he has shown how profitable detailed study can be made.

There are 268 plates and 269 illustrations. The first chapter is devoted to the embryology of the umbilical region with Brödel's descriptive pictures, which are of extraordinary merit. Thereafter follows a section upon the Anatomy of the Umbilical Region, with four plates containing sixty accurately drawn pictures of various umbilical types. Thereafter follow sections upon Umbilical Infection in the New-born; Umbilical Hemorrhage; Remnants of the Omphalo-Mesenteric Duct and Meckel's Diverticulum; Intestinal Cysts; Patent Omphalo-Mesenteric Duct, and its Complications; Cysts in the Abdominal Wall due to Remnants and Umbilical Concretions; Escape of Fluid Fæces; Parasites and other Foreign Substances from the Umbilicus; Umbilical Tumors; Umbilical Hernia; Patent Cystic Formation and Infection of the

Urachus; Acquired Urinary Fistula of the Umbilicus; and Malignant Changes in the Urachus.

This is of its kind a model work, scholarly, comprehensive, practical, and most serviceable to the practitioners of both medicine and surgery.

LOCAL AND REGIONAL ANESTHESIA. By Carroll W. Allen, M.D. W. B. Saunders Company, Philadelphia and London, 1914. Cloth $6 net; half-morocco $7.50 net.

This book, dedicated to Dr. Rudolph Matas, who contributes an excellent introduction to it, presents an enormous amount of scholarly research and a comprehensive presentation of the subject.

Beginning with the history of local anesthesia, there follow chapters upon Nerves and Their Sensations; Osmosis and Diffusion; The Anesthetic Effects of Pressure-Anemia; Local Anesthetics.

Novocaine hydrochlorate is recommended as the safest and most satisfactory anesthetic yet introduced. Toxicity is discussed at length. After a consideration of the general principles of technique and the indications and contraindications in shock and anociassociation, the methods of inducing local anesthesia are considered. Sections are devoted to methods applicable to the upper and lower extremities and the neck, the abdomen, and other regions of the body.

The directions given are sufficiently explicit to enable the skilful injector to perform practically any operation under local anesthesia.

Since this form of anesthesia will ultimately supplement all others in the great majority of surgical operations it behooves the alert surgeon to keep himself in thorough touch with its latest advances. Therefore Allen's book is likely to be serviceable to him.

SURGICAL OPERATIONS WITH LOCAL ANESTHESIA. By Arthur E. Hertzler, A.M., M.D., Ph.D., F.A.C.S. Second Edition. Surgery Publishing Company, New York, 1916. Price $3.

The fact that a second edition of this book is called for itself attests to the merits of the work. The author has enlarged the scope of his original book, but has not departed from his original plan of giving methods of procedure in minute detail. A chapter is devoted to the drugs which are used. In this chapter novocaine seems to be given first place, unfortunately so at this juncture, since the drug is difficult to get. Quinine and urea are warmly commended. The technique of injection is given in satisfactory detail. Thereafter follow directions for individual operations, the opening of abscesses, and abdominal procedures.

The infiltration method is the one of choice. Both the novice and he who believes in local methods and practices them will find much help in this work.

ORTHOPEDIC SURGERY. By Edward H. Bradford, M.D., and Robert W. Lovett, M.D. Fifth Edition, Illustrated. William Wood & Company, New York, 1915. Price $3.75 net.

The fifth edition of Bradford and Lovett's Orthopedic Surgery follows the lines of its predecessors. The first chapters are devoted to Tuberculous Diseases of the Bones and Joints. There is a chapter devoted to Arthritis Deformans. The treatment advised is essentially rational. Operative treatment is strongly advised for recurring displacement of the semilunar cartilage. The Surgery of Palsies is gone into very thoroughly. Talipes and other deformities of the feet are somewhat briefly considered. The call for edition after edition sufficiently attests the value of this work. It represents the direct teaching of men of ripe judgment and wide experience. Its pronouncements may be regarded as authoritative.

A TEXT-BOOK OF FRACTURES AND DISLOCATIONS. By Kellogg Speed, S.B., M.D., F.A.C.S. Illustrated. Lea & Febiger, Philadelphia and New York, 1916.

Considering the existence of such excellent text-books as those of Scudder, Cotton, and Stimson, there would seem no large need for a new text-book on the subject of fractures and dislocations, nor does a superficial inspection of this volume suggest that literature has been particularly enriched by

what is undoubtedly a painstaking and conscientious effort, but one evidencing neither clarity of vision nor vigor and directness of diction.

Under the subheading of Cosmetic and Functional Results the author states that "malunions, shortened legs, useless elbows or arms, angular deformities, are sources of embarrassment, and also, through causing a restriction of activity in a person otherwise healthy, are worth considering when manipulative treatment without open operation has left the conditions."

The illustrations are particularly good, the classifications at times confusing. The specific directions lack in that minute accuracy which makes them entirely serviceable and practicable. None the less a more careful perusal of the book shows much that is helpful to the surgeon who deals with this class of injuries.

PRACTICAL CYSTOSCOPY. By Paul M. Pilcher, A.M., M.D. Second Edition. W. B. Saunders Company, Philadelphia and London, 1915.

The second edition of this admirable book comes as a welcome guest to the workers in this department of surgery, since in addition to the accepted facts it contains all that is new and proven to be worth while. It is perfectly clear and specific in its descriptions of technique. The illustrations are admirable. The section on the Use of the High Frequency Current in Lesions of the Bladder is particularly serviceable at this juncture. It is a book thoroughly to be commended.

CORRESPONDENCE.

LONDON LETTER.

BY J. CHARLTON BRISCOE, M.D.

The Compulsory Service Act now before the House of Lords has not yet become law, but there is every prospect that it will receive the royal assent within the next few days. The medical profession will in the ordinary course of events be called up in exactly the same degree as any other profession, and it might be thought that the labors of the medical War Emergency Committee would be wasted by reason of this new act. Prior to this act it was understood that the scheme for enrolling medical men would be abandoned, unless a certain percentage of the medical profession enrolled. It was not announced what that percentage should be—surmises of about 70 per cent were stated—nor whether the requisite numbers were obtained. Obviously in view of compulsory service the matter becomes of no importance. A large amount of information as regards the medical requirements in various districts will have been obtained by this Committee, and no doubt this information will be placed at the disposal of the War Office, who may decide to act in accordance with the ideas set by the promoters of the scheme. Should medical men be called up on any other principle than the needs of the districts in which they reside, there will undoubtedly be severe shortage, for even now the medical profession is being worked very hard. It is generally believed that about 12,000 medical men are with the army, out of a total of about 30,000, and that a further 2000 may be required. This is taking nearly half the total number of the profession, while leaving nine-tenths of the population to be looked after by the remainder. Most people will agree that the medical profession is in ordinary times probably the most hard-worked body of men in the country, and the extra work which is likely to be imposed on those who stay behind may have serious consequences on their health and work. Fortunately no epidemic of any seriousness has arisen. There certainly has been rather more measles and German measles, and there is at the present time an increase in the cases of whooping-cough, but epidemics of serious nature and requiring close medical attention have not occurred during the past winter.

The necessity for producing more medical men for the Royal Army Medical Corps has led the government to take two steps which evoke criticism. For the last few years medical inspection of children by the school board medical officers has developed to a large extent. It is now proposed to remove these medical officers from their posts and transfer them to the R. A. M. C., the suggestion being that their positions would be temporarily occupied by older men or by women doctors. Providing the war does not go on for a long period, it would seem justifiable to dispense with this branch of the medical work. The children at the present time are thoroughly well inspected, and very little harm would result from lack of inspection for a period, say, of eighteen months. As a matter of fact, a large number of these posts are already held by women doctors, so that the regulation would not cause so much trouble as would at first sight appear. The second step taken is that the work of medical officers in connection with factories will be reduced, in that reports of accidents will be considerably abridged. This step has naturally met with a large amount of criticism, especially from the factory surgeons, but again this change should not be of vital importance to the community.

Dealing with medical work arising from the war, there is not a great deal to report. There is still a considerable influx of cases classified as shell shock, and of those coming under the heading of irritable hearts. There is much discussion as to the pathology of these conditions. The main views may be grouped as follows: First, that the condition is due to some preceding carditis; second, that it is a nervous phenomenon resulting from lack of vascular tone, which in itself may be associated with thyroid inefficiency; third, that it is due to some unknown toxemia, the cause of which is to be discovered; fourth, that it is due to some intestinal condition due to infection by a hitherto unknown organism. Looking at the condition broadly, it appears to be an accentuation of a similar state of affairs not infrequently found in practice apart from war-time, but no doubt accentuated by the extra strain. It will be noted that any of the theories advanced may be themselves dependent upon some toxic condition, which is not necessarily due to the results of military service. A number of these cases are being investigated at Mount Vernon Hospital under the auspices of the Medical Research Committee, which has taken over this institution. Formerly the hospital was devoted to the treatment of tuberculosis and other pulmonary conditions, but about three years ago was closed, and it was owing to this closure that the hospital has been acquired for the purposes of research. Prior to the war it was intended that the research should deal with all conditions in connection with tuberculosis, and no doubt research in this direction will be continued in the future.

Last Sunday and during the preceding afternoon the clocks were all put forward one hour, except those which by error were put back a similar time. It is quite remarkable what a small amount of grumbling or complaint has been voiced as a result of the change, the suggestion of which formerly produced so much opposition. Up to the present there seems to be very little perceptible alteration, except that we can eat our dinner and read the evening paper afterward in daylight instead of artificial light. So far the change seems all to the good in town. Later on there may be some difficulty in the country, as it is not supposed that the dew is likely to clear off the grass an hour earlier than the usual time to oblige the clock. This may have a tendency to cut the day's work in the grass and corn harvest one hour shorter than usual. This difficulty should be quite easily overcome with a little arrangement. Putting on of the clock one hour reminds me of an incident which occurred some years ago when I was a student at King's College. On the 31st of March some of the students got out on the roof over an archway onto the top of Somerset House, and with great effort pulled down the minute hand of the clock until it was advanced 15 minutes. Next morning it was quite in-

teresting to see the clerks coming in at the gate finding they were a quarter of an hour later than usual, hurrying across the court and entering their names as quickly as possible. Pulling down the minute hand of a large clock requires a good deal of effort.

Another change which has been brought in is not meeting with such favorable reception. Owing to lack of labor there is a tendency on the part of the authorities not to water the roads and streets as much as is usually done at this time of the year. The fear has been expressed that the result of increased dust will be to provoke a larger epidemic of infantile diarrhea than has occurred in the past few years. These epidemics have in the past been largely attributed to this cause. Against this theory has been placed the fact that attacks have occurred in houses where the milk has been taken in the morning and sterilized. In a certain number of cases I found that, though sterilized, the milk had been kept in an uncovered jug, and was therefore liable to a fresh infection. Directions are now given to obviate this condition, and where carried out properly the attacks have ceased or not occurred. Amongst the many diseases which have been attributed to street and road dust is anterior poliomyelitis. These suggestions have been put forward by several men who were investigating the epidemics which occurred in various parts of the country, Devonshire suffering rather severely about three years ago. We must therefore hope that this innovation will be cancelled, and the regulations as to watering the streets be enforced as formerly.

COMPOUND DISLOCATION OF THE PHALANGES.

Editors of the THERAPEUTIC GAZETTE.

SIRS: I wish to report a case in which the distal end of the metacarpal bone of the thumb was thrust through the thenar eminence, projecting nearly an inch from the skin, appearing as clean and shining as a new billiard ball, excepting for some adherent coal dust, which was washed off with water. The bone was replaced and the wound was dressed with boric acid powder, which with the few drops of blood exuding perfectly sealed the wound. The dressing was removed by the patient in two or three days. Late examination showed good motion and trifling enlargement of the joint.

A second case of some interest was observed in 1895. The rough drawing illustrates the nature of the injury, the end of the second phalanx protruding through the skin, the extremity of the distal portion of the torn flexor tendon not showing. The attending surgeon had some difficulty in replacing the distal phalanx, that part of the flexor tendon attached to the base of

the bone being dragged between its articulation and that of the proximal phalanx by efforts at reduction. The extensor tendon promptly pulled the bone out of place as soon as holding pressure was removed. Small forceps were introduced through the torn skin, and these grasped the piece of flexor tendon attached to the first phalanx, pulling it from between the bones and out through the skin wound. The distal phalanx was then easily replaced, requiring no force to hold it in position. The end of the flexor tendon was replaced in its sheath, but was not stitched. When the bandage was removed there was some enlargement of the joint and difficulty in picking up small objects, but later there was nearly normal movement of the first phalanx. Even at this reporting there was still slight enlargement at the joint, but movement is good, flexion almost normal.

ARTHUR A. RADCLIFFE, M.D.

WAUKEGAN, ILL.